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MT1000A-13-R3

MT1000A-85-R3

T1 Fiber Multiplexer

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Quick Start Guide

If you are familiar with the MT1000A, use this guide to prepare it for operation. Perform the following steps.

1. Installing MT1000A

Connecting the Tributary T1 Interfaces

➤ **To connect the balanced T1 interface (RJ-45 connector)**

- Connect the RJ-45 connector of the cable to the T1 port.

Connecting the Uplink

➤ **To connect a fiber optic uplink**

1. Clean the optical connectors using an approved solvent, and dry thoroughly using optical tissue.
2. Connect to the two optical connectors designated TX (transmit output) and RX (receive input) of the appropriate interface.
3. Pay attention to correct connection of the transmit and receive cables to the corresponding connectors. Avoid sharp bends and twisting of the fiber-optic cables.

Note *For WDM option, only one fiber optic cable per link should be connected.*

Connecting the Power

Warning

Before switching ON this unit and before connecting or disconnecting any other cable, the protective earth terminals of this instrument must be connected to the protective ground conductor of the mains (AC or DC) power cord. If you are using an extension cord (power cable) make sure it is grounded as well.

Any interruption of the protective grounding conductor (inside or outside the instrument) or disconnecting the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

Connecting the AC/DC Power

The MT1000A is supplied with a Wide Range AC/DC power supply. The wide-range AC/DC power supply accepts current from both AC and DC sources. From an AC source, the power supply can receive any voltage in the range of 100 VAC to 240 VAC. From a DC source, the 48 VDC power supply can receive any voltage in the range of 36 to 72 VDC.

This unit is equipped with a standard AC-type 3-prong power input connector located on the unit rear panel. This power input connector can be used for both AC and DC voltage inputs. AC or DC power should be supplied to MT1000A through the 5-feet (1.5m) standard power cable terminated by a standard 3-prong plug.

➤ **To connect MT1000A to AC power:**

1. Connect the power cable to the connector on the MT1000A rear panel.
2. Connect the power cable to the electricity outlet.

➤ **To connect MT1000A to 48V DC power:**

- Refer to the green Supplement at the end of this manual titled: *DC Power Supply Connection – AC/DC Adaptor (AD) Plug*.

Connecting the DC Power

When connecting the DC power, the PWR pin must be connected to the ungrounded line of the central battery (either – or +). The RTN pin must be connected to the grounded line of the central battery. The GND pin must be connected to the protected earth of the building installation.

➤ **To connect MT1000A to 24V DC power:**

- Refer to the green Supplement at the end of this manual titled: *DC Power Supply Connection – Terminal Block Connector*.

Caution ***The DC installation procedure must be performed by a qualified technician***.

Contents

Chapter 1. Introduction

1.1 Overview 1-1
General 1-1
Features 1-1
Application 1-2
1.2 Physical Description 1-2
Physical Characteristics 1-2
1.3 Functional Description 1-3
Fiber Optic Link 1-3
Tributary Interface Characteristics 1-4
Test and Diagnostics Capabilities 1-5
Alarms and Alarm Indications 1-5
Management and Monitoring 1-6
Power Requirements 1-6
1.4 Technical Specifications 1-7

Chapter 2. Installation and Setup

2.1 Introduction 2-1
2.2 Site Requirements & Prerequisites 2-1
Power 2-1
Tributary Connections 2-1
Fiber Optic Link Connections 2-2
Front and Rear Panel Clearance 2-2
Unit Clearance 2-2
Ambient Requirements 2-2
2.3 Equipment Needed 2-2
2.4 Package Contents 2-2
2.5 Installation and Setup 2-3
Setting the Internal Switches 2-3
2.6 Interfaces and Connections 2-6
Connector Location 2-6
Grounding 2-7
Connecting the Power 2-7

Chapter 3. Operation

3.1 General 3-1
3.2 Turning MT1000A On 3-1
3.3 Front Panel Indicators and Switches 3-1
3.4 Normal Indications 3-3
3.5 Turning MT1000A Off 3-3

Chapter 4. Configuration

4.1 Introduction 4-1
Terminal Management Modes 4-1
4.2 Setting Terminal Communication 4-1

Setting the Terminal Communication Parameters 4-1
Entering the Terminal Session 4-2
4.3 Monitoring the System 4-4
Monitoring the Status of the Local System 4-5
Monitoring the Status of the Remote System 4-7
4.4 Monitoring the Physical Ports 4-7
Monitoring the Status of the Ethernet Port 4-8
Monitoring the Status of the Up-Link 4-9
Monitoring the Status of the Channel Port 4-9
4.5 Working with the System Log File 4-10
Displaying the System Log File 4-10
Clearing the System Log File 4-11
4.6 Alarms 4-11
Displaying System Alarms 4-11
Displaying Physical Port Alarms 4-12
4.7 Configuring the MT1000A 4-13
Configuring redundancy 4-13
Setting the Device Information 4-16
Setting the network parameters 4-17
Setting up the Manager List 4-18
Setting the Management Access 4-18
Setting the User Name and Password 4-19
Configuring the Control Port 4-20
Resetting the Factory Defaults 4-21
Resetting the MT1000A 4-21
4.8 Configuring the Physical Ports 4-21
Configuring the Ethernet Port 4-21
Configuring the Channels 4-23
Configuring the Up-Links 4-23
4.9 Diagnostics 4-24
Setting the E2 Local Loopback Timeout 4-24
Setting Loopbacks in the Local MT1000A 4-25
Setting Loopbacks in the Remote MT1000A 4-26
Displaying Loop Status 4-26
4.10 Viewing Hardware and Software Updates 4-27
4.11 Downloading Software 4-27
Downloading Software using the TFTP Protocol 4-27
Downloading Software using the X-Modem Protocol 4-29
4.12 Viewing file and file system information 4-29

Chapter 5. Testing and Diagnostics

5.1 Introduction 5-1
5.2 Troubleshooting 5-1
5.3 List of Alarms and Events 5-3
5.4 Diagnostic Tests 5-4
Local Loopbacks in the MT1000A 5-5
Remote Loopbacks in the MT1000A 5-7

Appendix A. Interface Specifications

Appendix B. MT1000A MIBs

Chapter 1
Introduction

1.1 Overview

General

MT1000A is a second-order multiplexer that combines four T1 (1.544 Mbps) tributary data streams into a single fiber optic link.

The fiber optic interface provides a secure link in hazardous or hostile environments, increases the maximum connection range, and achieves immunity against electrical interference and protection against the harmful effects of ground loops.

Features

The main features of the MT1000A multiplexer are:

- MT1000A multiplexes four T1 channels over a single fiber optic link
- A pair of MT1000A units offers simple connectivity for four T1 channels at distances of up to 120 km (74.5 miles)
- Redundant power supply
- Optional second fiber optic link for automatic backup
- Operates with multimode or single mode fiber; and single mode over single fiber in the standalone version (WDM)
- An optional second power supply for power redundancy and fail-safe operation
- Transmits each of the T1 channels independently, so that each T1 channel can have it's own clock source
- To facilitate system diagnostics, MT1000A features LED status indicators, AIS alarm generation, recognition and dry contact closure upon link failure.
- Setup, control and diagnostics can be performed via ASCII terminal, SNMP management station, or Ethernet link using Telnet or Web-based management interface
- Conforms to ITU G.703, G.823, G.824 and G.955
- Compact 1U high size.

Application

The following diagram illustrates a typical MT1000A configuration:

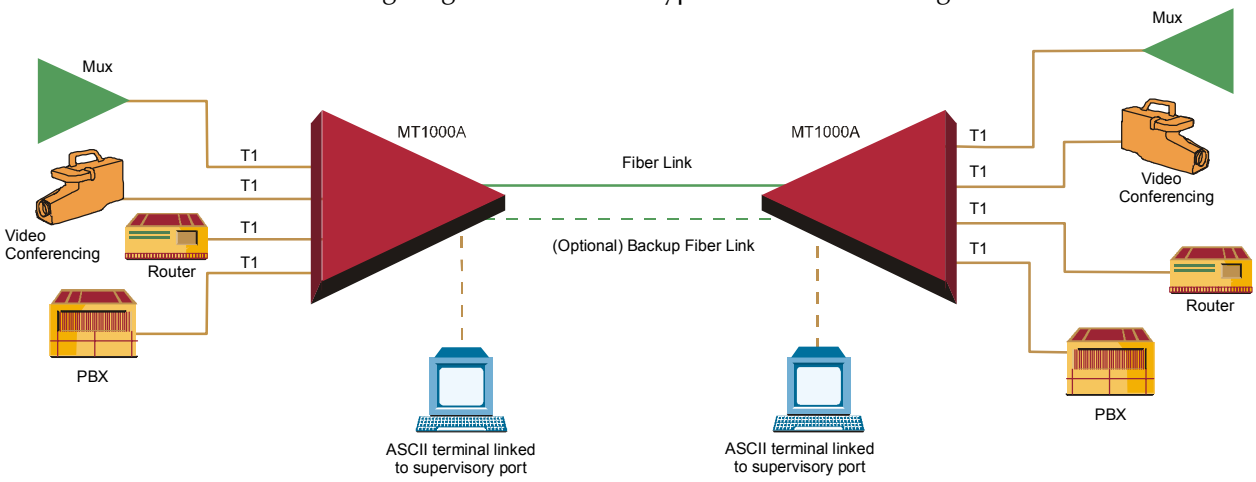


Figure 1-1 Typical MT1000A Application

1.2 Physical Description

Physical Characteristics

MT1000A is a compact unit, intended for installation on desktops or shelves. Unit height is only 1U (1.75"). An optional rack-mount adapter kit enables installation of MT1000A unit in a 19" rack.

The MT1000A front panel provides LED indicators, a control connector and a headset jack, as illustrated in *Figure 1-2*. For more information about front panel indicators and connectors, refer to *Chapter 2*.

Power connector/s, fiber optic connectors and T1 interfaces can be accessed via the MT1000A rear panel. For more information about rear panel connectors, refer to *Chapter 2*.

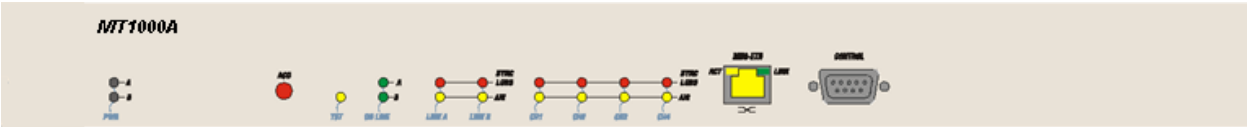


Figure 1-2 MT1000A Front Panel

1.3 Functional Description

MT1000A contains the following printed circuit boards:

- One main circuit board that includes four tributary interfaces
- One or two fiber optic interface boards (A and B)
- One or two power supplies (A and B): AC/48 VDC wide-range power supply or 24VDC power supply.

Fiber Optic Link

Fiber Optic Link Interface Characteristics

The fiber optic interface can be used to provide a secure link in hazardous or hostile environments, increase the maximum connection range, and achieve immunity against electrical interference and protection against the harmful effects of ground loops.

The fiber optic interface complies with the requirements of ITU-T Rec. G.956, and uses a proprietary signaling format that ensures optimum performance. To optimally meet a wide range of system requirements, the fiber optic interface can be ordered for operation over 62.5/125 micron multi-mode fibers (typical attenuation 3.5 dB/km at 850 nm), as well as over low-loss 9/125-micron single-mode fibers (typical attenuation 0.4 dB/km at 1310 nm, and 0.25 dB/km at 1550 nm). Most of the options can be ordered with ST, SC, or FC/PC connectors. In addition, 9/125-micron single mode over a single fiber is also available (with SC connectors only).

Note

The SF3 option uses an SC/APC connector. The FO cable connected to it must therefore be of the same type.

Table 1-1 provides information on the characteristics of the optical sub-system, including the maximum range over typical fiber optic cable. The maximum range values given in the table assume a 3 dB margin.

Table 1-1 Fiber Optic Interface Characteristics

Wavelength [nm]	Fiber Type [μm]	Transmitter Type	Typical Output Power [dBm]	Receiver Sensitivity [dBm]	Typical Max. Range [km miles]		Connector Type
850	62.5/125 multimode	Laser (VCSEL)	-15	-34	4.5	2.8	ST, SC, FC/PC
1310	9/125 single mode	Laser	-12	-34	47	29.2	ST, SC
1310	9/125 single mode	Laser [long haul]	-2	-34	72	44.7	ST, SC, FC/PC
1310 Transmit/Receive	9/125 single mode	Laser [SF3]	-12	-27	20	12.4	SC/APC only
1310/1550 Transmit/Receive	9/125 single mode	Laser WDM [SF1]	-12	-34	47	29.2	SC
1550/1310 Transmit/Receive	9/125 single mode	Laser WDM [SF2]	-12	-34	47	29.2	SC
1550	9/125 single mode	Laser	-12	-34	76	47.2	ST, SC, FC/PC
1550	9/125 single mode	Laser [long haul]	-1	-34	120	74.5	ST, SC, FC/PC

All the fiber optic interface options offer high performance and have a wide dynamic range, which ensures that the receiver does not saturate even when using short fiber optic cables (saturation is caused when the optical power applied to the receiver exceeds its maximum allowed input power, and results in very high bit error rates).

Fiber Optic Link Redundancy Option

MT1000A can be ordered with one or two link interface options. Each interface operates independently, and can be ordered from any of the link options listed above.

In the fiber optic link redundancy option, MT1000A supports fully automatic switching between link A and link B. Link A has priority. Therefore, normally link A is selected for use, and link B is disabled. In case a failure occurs on link A, MT1000A automatically switches to link B and continues providing normal service. After link A returns to normal operation, it is automatically reselected.

Each link interface has its own set of indicators that show the current state of the link. AIS alarm will not appear for the non-active optical link.

Tributary Interface Characteristics

The MT1000A tributary interfaces meet the requirements of ITU-T Rec. G.703. Each tributary port has a 100Ω balanced line interface terminated in an RJ-45 eight-pin connector.

Line coding is B8ZS or AMI. The nominal balanced interface transmit level is ±3.0 V. The line attenuation is up to 12 dB, and each T1 signal is processed by an adaptive equalizer that compensates for various cable lengths to ensure optimal performance. Phase Locked Loops (PLL) are used to recover the clock signals, and the resulting jitter performance complies with the requirements of ITU-T Rec. G.824.

Each tributary interface has its own set of indicators that show the current state of the tributary link. The user can disable the alarm indications generated by unused interfaces (via internal switch and terminal, see *section 2.5*). AIS data streams are transmitted instead of failed or unconnected tributary data streams.

Test and Diagnostics Capabilities

MT1000A has comprehensive test and diagnostics capabilities that include local and remote loopbacks on the fiber optic link interface and on each tributary link. The activation is performed by sending a special test sequence through the fiber optic link. An automatic self-test on power-up further enhances maintenance.

For more information on activating loopbacks see *Chapter 4*.

Alarms and Alarm Indications

MT1000A can detect the following alarm conditions on each T1 and fiber optic interface:

- Loss of input signal
- Loss of frame synchronization
- Reception of alarm indication (AIS) signal, which consists of a continuous sequence of 1s.

Notes

- *When AIS is received, loss of frame synchronization occurs. However, in this case the alarm indicating the loss of frame synchronization is suppressed.*
- *AIS alarm will not appear for the non-active optical link.*

When not all the tributaries are in use, the user can disable the alarm indications related to the unused tributaries.

The response to alarm conditions is as follows:

- AIS is transmitted on each tributary output in the following cases:
  - Loss of fiber optic input signal is detected
  - AIS is received on the fiber optic input
  - Loss of fiber optic frame synchronization.
- For each tributary, an AIS signal is sent instead of the tributary data stream through the fiber optic link in the following cases:
  - Loss of tributary input signal is detected
  - AIS is received on the tributary input
  - Loss of tributary frame synchronization.

Front panel indicators display each alarm condition. In addition, a dedicated connector is used to provide major and minor alarm indications, by means of dry contacts.

The major alarm is activated in the following cases:

- MT1000A is not powered, or total power supply failure (e.g., when two power supplies are installed, failure of both supplies).
- Loss of fiber optic input signals, or loss of fiber optic frame synchronization.
- Loss of tributary input signals, or loss of frame synchronization
- Unable to activate redundancy.

The minor alarm is activated in the following cases:

- Reception of AIS signal on the fiber optic input.
- Reception of AIS signal on tributary inputs.

Management and Monitoring

MT1000A units are equipped with a front panel serial RS-232 management port and an Ethernet management port. The RS-232 port operates at user-selectable rates of 9.6, 19.2, 38.4, 57.6 and 115.2 kbps over a null-modem cable. The Ethernet port operates at a rate of 10 Mbps and can be set to full- or half-duplex.

The management interface supports the following management methods:

- **Supervision Terminal**–An ASCII terminal connected to the RS-232 port (or a PC running a terminal emulation program) can be used as a supervision terminal. All software required for the various management functions available through the terminal is contained in the MT1000A.
- **SNMP Management**–The management interface includes an SNMP agent that enables SNMP management of the MT1000A, using the UDP-over-SLIP (Serial Link Internet Protocol) protocol. The SNMP agent also enables management by other SNMP-based systems.
- **Ethernet Management**–A management terminal can be connected to the MT1000A via an Ethernet connection, using a UTP-CAT5 cable. The 10BaseT Ethernet interface supports a throughput of 10 Mbps. All software required for the various management functions available through the terminal is contained in the MT1000A.

Power Requirements

MT1000A can be ordered with one or two power supplies. Two types of power supplies are available:

- AC/DC wide-range for operation on AC (100 to 240 VAC) or on DC (40-72 VDC) sources
- DC operation on 24 VDC source.

Each power supply (A and B) can be ordered as one of the above power supply types).

When two power supplies are installed, they share the load; in case one of the supplies fails or its input power is disconnected, the other power supply continues providing power to MT1000A.

1.4 Technical Specifications

Fiber Optic Interface Characteristics

Applicable Standards	ITU-T Rec. G.956
Performance	Refer to Table 1-1
Connectors	ST, SC, or FC-PC, in accordance with ordered option (SF1/SF2 options only available with SC) (SF3 option only available with SC/APC)

T1 Tributary Interface Characteristics

Applicable Standards	ITU-T Rec. G.703, G.824
Nominal Line Data Rate	1.544 Mbps
Line Code	B8ZS / AMI
Line Impedance	100Ω, balanced
Signal Levels	
Transmit Levels	±3.0 V ±20%
Receive Levels	0 dB to –12 dB
Jitter Performance	Per ITU-T Rec. G.824
Connector	RJ-45

Indicators

Loss of input signal for the fiber optic link and for each tributary

Reception of AIS signal for the fiber optic link and for each tributary (loss of frame synchronization alarm suppressed)

TEST (when loopbacks are active)

Power on

Active Receiving link

CONTROL DTE Supervisory Port (Optional)

Interface	V.24/RS-232, asynchronous DTE interface
Connector	9-pin D-type female connector
Data Rate	9.6, 19.2, 38.4, 57.6 and 115.2 kbps

MNG-ETH

Physical Interface	10BaseT
Data Rate	10 Mbps
Transmission Mode	Full/Half-duplex
Connector	Shielded RJ-45
Cable Type	UTP-CAT5

ALARM Connector

Connector	9-pin D-type female connector
Contact Functions	Set of floating normally-closed/normally-open contacts for major and minor alarm indication
Contact Rating	Maximum 1A (at 30 VDC or 30 VAC) through closed contacts

Physical Characteristics

Height	44 mm / 1.75 in (1U)
Width	440 mm / 17.4 in
Depth	240 mm / 9.5 in
Weight	2 kg / 4.4 lb

Power Requirements

AC/DC Powered Units	100 to 240 VAC, 50 or 60 Hz, 13.5 VA -or- 40–72 VDC, 9.5 W
DC Powered Units	24 VDC, 7.5 W

Note: *MT1000A can support up to two (redundant) power supplies.*

Environment

Operating Temperature	0° to 50°C (32° to 122°F)
Relative Humidity	Up to 90%, non-condensing

Chapter 2
Installation and Setup

2.1 Introduction

MT1000A is delivered completely assembled. It is designed for operation as a desktop unit or for mounting in a 19-inch rack. For instructions of rack mounting, refer to the *Rack Mounting Kit for 19 inch Racks* guide that comes with the RM kit.

Mechanical and electrical installation procedures for MT1000A are provided in the following sections.

After installing the unit, refer to *Chapter 3* for operating instructions and system configuration procedures.

In case a problem is encountered, refer to *Chapter 5* for test and diagnostics instructions.

Warning

No internal settings, adjustment, maintenance, or repairs may be performed by either the operator or the user; such activities may be performed only by a skilled technician who is aware of the hazards involved.
Always observe standard safety precautions during installation, operation, and maintenance of this product.

2.2 Site Requirements & Prerequisites

Power

AC/DC-powered MT1000A units should be installed within 1.5m (5 feet) of an easily accessible grounded AC outlet capable of furnishing a supply voltage in the range of 100 to 240 VAC or 40–72 VDC.

DC-powered MT1000A units require a 24 VDC power source.

Tributary Connections

Each MT1000A tributary interface has one RJ-45 connector. *Appendix A* provides the pin allocation for the RJ-45 connector.

The maximum allowable line attenuation between each tributary port and the user's equipment is 12 dB.

Fiber Optic Link Connections

Each fiber optic link interface is terminated in two ST, SC, or FC-PC connectors, in accordance with order. The maximum allowable attenuation depends on the interface option ordered (refer to *Table 1-1*).

When working with the WDM option, only one fiber optic cable per link should be connected. The two types – SF1 and SF2 – must work opposite each other; SF1 cannot work opposite SF1, and SF2 cannot work opposite SF2.

Front and Rear Panel Clearance

Allow at least 90 cm (36 inches) of frontal clearance for operator access. Allow at least 10 cm (4 inches) clearance at the rear of the unit for interface cable connections.

When planning the routing of fiber optic cables, avoid sharp bends.

Unit Clearance

Allow 1U clearance above MT1000A-E1 for proper ventilation.

Ambient Requirements

The ambient operating temperature of the MT1000A is 0° to 50°C (32° to 122°F), at a relative humidity of up to 90%, non-condensing.

2.3 Equipment Needed

The equipment needed to install the MT1000A is:

- ST, SC or FC/PC fiber optic interface link connector cables
- RJ-45 T1 connector cables (for tributary interface)
- Phillips screwdriver (for installation in 19 inch rack).

2.4 Package Contents

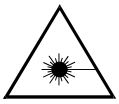
The MT1000A package contains the following:

- MT1000A multiplexer
- CBL-DB9M/DB9F cable
- Two power supply cables
- AC/DC Adaptor (AD) plug
- *MT1000A Installation and Operation* manual

2.5 Installation and Setup

➤ **To install MT1000A:**

1. Set the internal switches.
2. Connect MT1000A's various interfaces in the order listed here.



This module may include Class A or Class 1 lasers. For your safety:

- **Do not look directly into the optical connectors while the module is operating. Remember that the MT1000A starts operating as soon as it is powered.**
- **Do not attempt to adjust the laser drive current.**

The use of optical instruments with this product will increase eye hazard. Laser power up to 1 mW at 850 nm and at 1310 nm could be collected by an optical instrument.
Use of controls or adjustment or performing procedures other than those specified herein may result in hazardous radiation exposure.
WARNING: The laser beam is invisible.

Setting the Internal Switches

Prior to MT1000A installation, check the positions of its internal switches. If necessary, change the settings in accordance with the specific requirements of your application.

Opening MT1000A Case

➤ **To open MT1000A and access reach the internal switches:**

1. Disconnect all the cables connected to MT1000A.
2. Unscrew the eight screws on the top panel.
3. Unscrew the screws on both side panels.
4. Remove the top cover.

Warning

Access to the inside of the equipment is permitted only to qualified and authorized service personnel.
To avoid accidental electric shock, always disconnect the unit from the power line and from all the cables before removing the cover.
Dangerous high voltages are present inside the MT1000A when it is connected to power and/or to the links. Moreover, under external fault conditions, dangerous high voltages may appear on the lines connected to the MT1000A.
Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible and, when inevitable, would be carried out only by a skilled technician who is aware of the hazard involved.
Capacitors inside the instrument may still be charged even after the instrument has been disconnected form its source of supply.

Caution The MT1000A contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components, unless also touching the MT1000A frame.

There are jumpers that are not listed below. They are set by the manufacturer and should not be touched.

Setting the Internal Switches

The internal switches are located on the MT1000A main and interface boards as identified in *Figure 2-1*. The functions of the switches are described in Table 2-1.

➤ **To set the switches:**

1. Identify the switch locations, refer to *Figure 2-1*.
2. Change the settings as required (refer to the following table for settings).

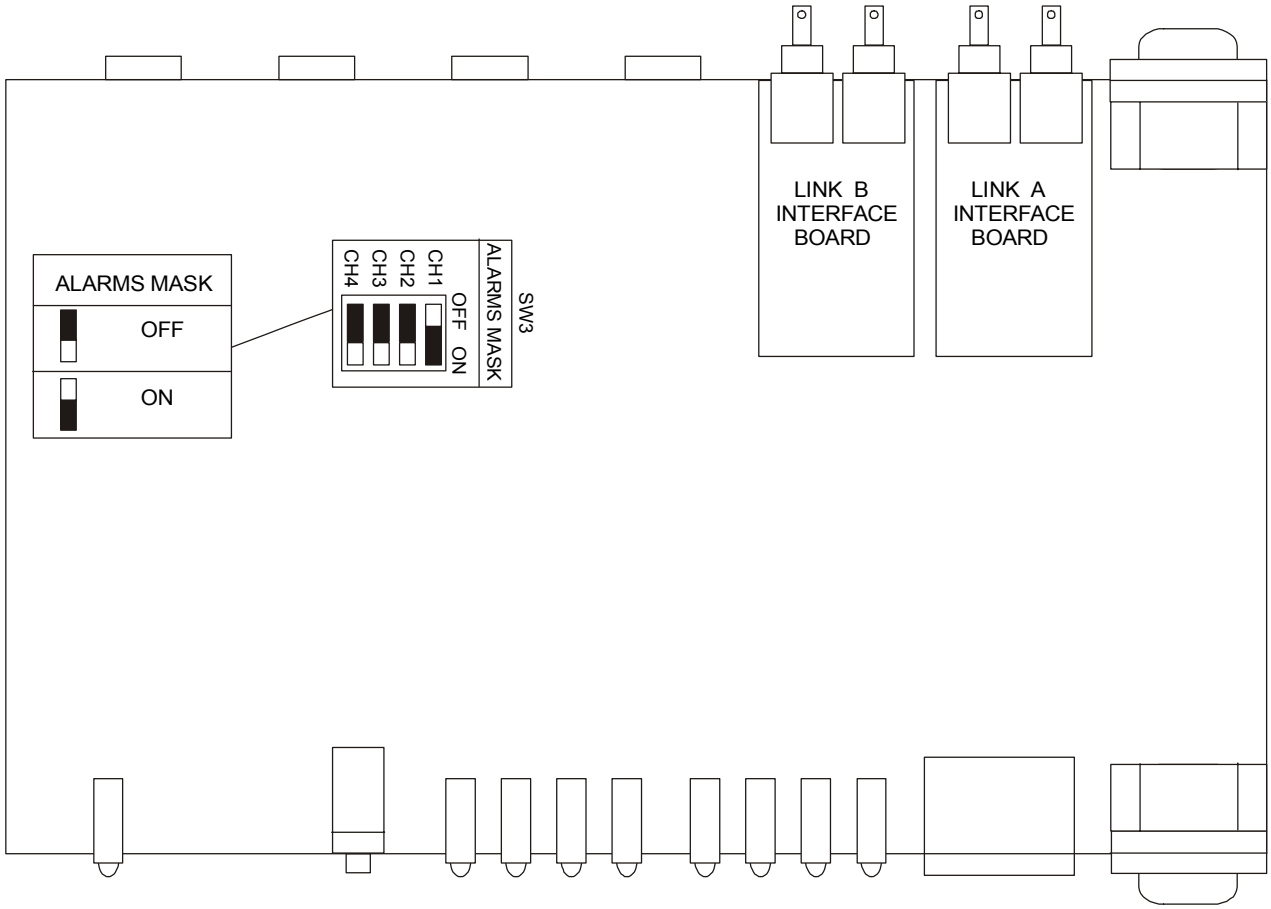


Figure 2-1 MT1000A Main Board, Internal Settings

Table 2-1. MT1000A Switch Settings

Switches	Description	Values	Factory Setting
SW3 Tributary Alarms Mask	Along with the software, controls the operation of the alarms and whether they are ignored or processed	SW3-1 sets CH 1 SW3-2 sets CH 2 SW3-3 sets CH 3 SW3-4 sets CH 4 **OFF**—The decision whether the alarm (of the specific channel) is masked or not is determined by the software setting. **ON**—Mask the channel. This channel will not request a relay activation command. The software will indicate the stattus of this channel, but the status cannot be changed via the software.	OFF

Closing the MT1000A Cover

After completing the internal settings, replace the cover on the unit.

➤ **To close the cover:**

1. Place the top cover on the unit.
2. Insert the screw on both side panels.
3. Insert the eight screws on the top panel

Note

Insert the original cover screws in their positions and tighten carefully. Do not use excessive force.

2.6 Interfaces and Connections

Connector Location

Figure 2-2 shows a typical MT1000A rear panel, and identifies connector locations.

Connector pin allocations appear in Appendix A.

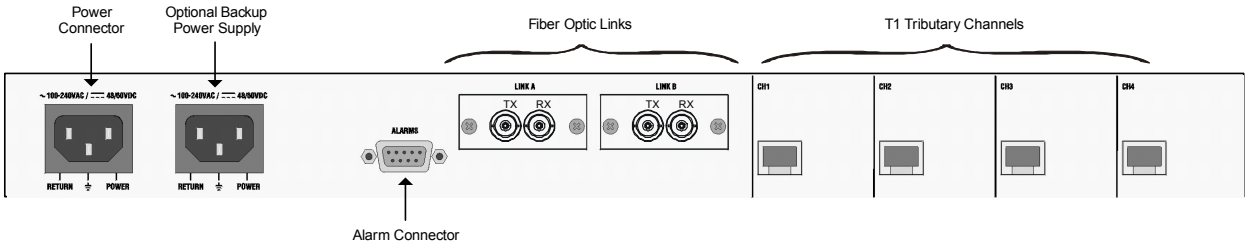


Figure 2-2 Typical MT1000A Rear Panel

Connecting the Tributary Channels

Each tributary interface includes one RJ-45 connector.

➤ **To connect the tributary channels:**

- Connect each of the tributary cables to the connector(s) corresponding to the interface in use. Connect to the RJ-45 connectors designated CH1, CH2, CH3 and CH4.

Connecting the Fiber Optic Links

Each fiber optic interface is terminated in two ST, FC or FC/PC connectors, in accordance with the ordered option. The connection to the fiber optic link (A and B) is made using one of two groups of connectors – one for link A and the other for the optional link B. The connector types (ST, SC, FC/PC) depend on the interface option in use.

➤ **To connect the fiber optic links:**

1. Before connecting, clean the optical connectors using an approved solvent and dry thoroughly using optical tissue.
2. For each fiber optic link interface (A and B), connect two optical cables to the two optical connectors designated TX (transmit output) and RX (receive input) of the appropriate interface. Pay attention to correct connection of the transmit and receive cables to the corresponding connectors. Avoid sharp bends and twisting of the fiber optic cables.
3. For the WDM option, only one fiber optic cable per link should be connected.

Connecting the Alarm Relays

The ALARM connector is used to connect to the changeover contacts of the major and minor alarm relays.

➤ **To connect the alarm relays:**

- Connect the cable to the ALARM connector on the rear panel.

Grounding

The connection of the protective ground is accomplished through one of the pins of the power connector, both for the AC and DC versions.

Warning

This instrument may become dangerous if damage to the protective (grounding) conductor (inside or outside the instrument) occurs or if disconnecting from the protective ground terminal.

➤ **To ground MT1000A:**

- Connect the protective ground terminals of the MT1000A to the protective ground conductor of the power cord.

Connecting the Power

Figure 2-2 shows a typical rear panel power for an MT1000A unit with a dual AC power supply. When only one power supply unit is installed, the rear panel includes a single power connector.

The wide-range AC/DC power supply inside the MT1000A accepts current from both AC and DC sources. From an AC source, the power supply can receive any voltage in the range of 100 to 240 VAC. From a DC source, the 48 VDC power supply can receive any voltage in the range of 40 to 72 VDC.

When connecting the DC power, the PWR pin must be connected to the ungrounded line of the central battery (either – or +). The RTN pin must be connected to the grounded line of the central battery. The GND pin must be connected to the protected earth of the building installation.

Warning

Before switching on this instrument, the protective earth terminals of the instrument must be connected to the protective ground conductor of the power cord. The power plug may only be inserted in a power outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord (power cable) without a protective conductor (grounding).

Whenever it is likely that the protection offered by the internal fuses has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

Connecting the AC/DC Power

The MT1000A is supplied with a Wide Range AC/DC power supply. This unit is equipped with a standard AC-type 3-prong power input connector located on the unit rear panel. This power input connector can be used for both AC and DC voltage inputs. AC or DC power should be supplied to MT1000A through the 5-feet (1.5m) standard power cable terminated by a standard 3-prong plug.

➤ **To connect MT1000A to AC power:**

1. Connect the power cable to the connector on the MT1000A rear panel.
2. Connect the power cable to the electricity outlet.

➤ **To connect MT1000A to 48V DC power:**

- Refer to the green Supplement at the end of this manual titled: *DC Power Supply Connection – AC/DC Adaptor (AD) Plug*.

Connecting the DC Power

➤ **To connect MT1000A to 24V DC power:**

- Refer to the green Supplement at the end of this manual titled: *DC Power Supply Connection – Terminal Block Connector*.

Caution ***The DC installation procedure must be performed by a qualified technician***.

Chapter 3
Operation

3.1 General

In this chapter you will find detailed instructions for operating the MT1000A.

The information presented in this chapter includes a description of the MT1000A front panel controls, and operating procedures (turning on, front-panel indications, and turning off).

3.2 Turning MT1000A On

➤ **To turn on an MT1000A unit with a single power supply:**

1. Connect the power cable to the power connector on the rear panel of the MT1000A.
2. Connect the power cable to the electricity outlet.

   The PWR A indicator lights in green.

➤ **To turn on an MT1000A unit with two power supply units:**

1. Connect each power cable to a power connector on the rear panel of the MT1000A.
2. Connect each power cable to the electricity outlet.

   The corresponding PWR indicator(s) light in green.

3.3 Front Panel Indicators and Switches

Figure 3-1 shows the front panel of the MT1000A. *Table 3-1* lists the functions of the MT1000A controls, connectors and indicators located on the MT1000A front panel. The index numbers in *Table 3-1* correspond to the item numbers in *Figure 3-1*.

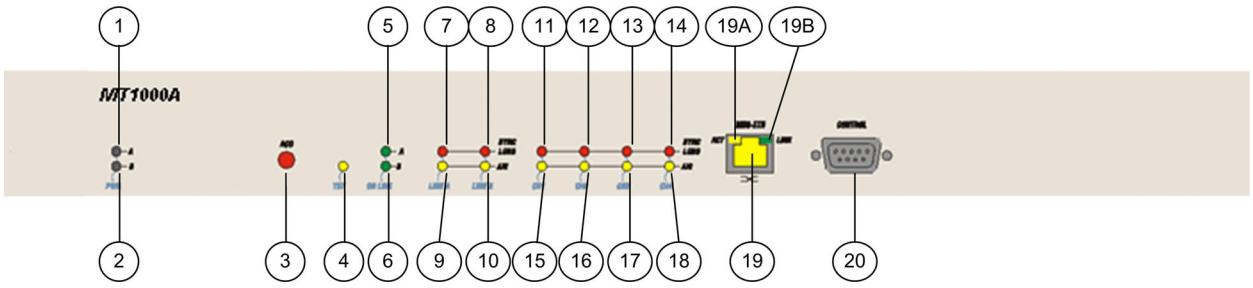


Figure 3-1 MT1000A Front Panel

Table 3-1 MT1000A Controls, Connectors and Indicators

NO	Control or Indicator	Function
1	PWR A indicator	**ON (green)** – Power supply A is turned on and is operating normally. **ON (red)** – Power supply A is turned on and a malfunction has been detected or is not been turned on. In this case, MT1000A continues to operate normally using power supply B (when installed).
2	PWR B indicator	**ON (green)** – Power supply B is turned on and is operating normally. **ON (red)** – Power supply B is turned on and a malfunction has been detected or has not been turned on. In this case, MT1000A continues to operate normally using power supply A. **Off** – Power supply B is not assembled.
3	ALARM CUT OFF (ACO) push-button	When this button is pressed, the indication of current alarms is suppressed and only new alarms are indicated.
4	TST indicator	**ON** – The MT1000A is in test condition (local or remote loopback).
5	ON LINE A indicator	**ON** – Link A is active. **OFF** – Link A is not active.
6	ON LINE B indicator	**ON** – Link B is active. **OFF** – Link B is not active.
7	SYNC LOSS LINK A indicator	**ON** – Link A bit error rate exceeds 10^{-6}.
8	SYNC LOSS LINK B indicator	**ON** – Link B bit error rate exceeds 10^{-6}.
9	AIS LINK A indicator	**ON** – AIS signal is received on link A.
10	AIS LINK B indicator	**ON** – AIS signal is received on link B.
11	SYNC LOSS CH1 indicator	**ON** – The corresponding tributary interface reports loss of input signal.
12	SYNC LOSS CH2 indicator	
13	SYNC LOSS CH3 indicator	
14	SYNC LOSS CH4 indicator	

Table 3-1. MT1000A Controls, Connectors and Indicators (Cont.)

NO	Control or Indicator	Function
15	AIS CH1 indicator	**ON** – AIS signal is output by the corresponding tributary interface.
16	AIS CH2 indicator	
17	AIS CH3 indicator	
18	AIS CH4 indicator	
19	MNG-ETH connector	Connection to the optional management Ethernet interface.
19A	MNG-ETH ACT indicator	**ON** – Data is being transferred on the Ethernet link.
19B	MNG-ETH LINK indicator	**ON** – The Ethernet line is "alive".
20	CONTROL connector	Connection to the optional management interface.

3.4 Normal Indications

During normal operation:

- The PWR indicators of the active power supply sources light in green.
- The indicator corresponding to the fiber optic link in use (A or B) is lit.
- All the SYNC LOSS, AIS, and TST front-panel indicators are not lit.

3.5 Turning MT1000A Off

➤ **To turn off the MT1000A:**

- Disconnect the power cable(s) from the electricity outlet.

Chapter 4
Configuration

4.1 Introduction

The use of a terminal is optional for configuration, monitoring and maintenance operations.

Terminal Management Modes

The MT1000A provides the following terminal management modes:

- **Monitor** – A supervisory ASCII ANSI terminal or a PC emulating an ASCII ANSI terminal connected directly to the MT1000A CONTROL port.
- **Ethernet** – A PC running terminal emulation software or a management workstation, connected to the MT1000A via an Ethernet cable. It must be possible to activate Telnet and Web access after setting the IP address.

Up to three users can be active simultaneously, one connected to the terminal and two via telnet or Web. When connected via Telnet or Web, the user is disconnected after 10 minutes of inactivity (no keyboard input on the client computer.)

MT1000A supports several management information bases (MIBs). Refer to *Appendix C* for details.

4.2 Setting Terminal Communication

Setting the Terminal Communication Parameters

➤ **To set the terminal communication parameters:**

1. Connect the terminal to the 9-pin CONTROL connector on the front panel of the MT1000A over a null-modem cable – CBL-DB9M/ DB9F. If a PC is used, run a terminal emulation program.
2. Set the default parameters of the terminal communication port to a baud rate of 19,200 bps, 8 bits per character, one stop bit and no parity bit.
3. Disconnect the MT1000A from the mains, and then reconnect it to the mains.
4. Wait until the Test LED starts blinking. This indicates that the device is ready to learn the baud rate of the terminal.
5. Press <Enter> or <.> at least four times.

MT1000A automatically detects and adapts itself to terminal baud rates of 9,600, 19,200, 38,400, 57,600 and 115,200 bps. After detecting the correct baud rate, the User name prompt is displayed, and the new baud rate is saved in the divide.

If the autodetection fails, the MT1000A CONTROL port uses the last baud rate that was saved in the device.

The MT1000A login screen (see *Figure 4-1*) is displayed.

```
                                MT1000A

  USER NAME:
  PASSWORD:


ESC - clear; & - exit                                    1 user(s)
```

Figure 4-1. MT1000A Login Screen

6. Enter your user name. The default user name is **USER**.
7. Enter your password. The default password for the default user name is **1234**.

The MT1000A Main Menu (see *Figure 4-2*) is displayed.

Entering the Terminal Session

Once you have logged into the system, the MT1000A Main Menu (see *Figure 4-2*) is displayed.

```
                            MT1000A

Main Menu

    System Description ... (MT1000A HW Version 0.0  SW Version
3.00)

 1. Configuration   >
 2. Monitoring      >
 3. Diagnostics     >
 4. File Utilities  >

>

Please select item <1 to 4>

ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-2 Main Menu

For the applicable operation using the terminal, refer to *Figure 4-3*.

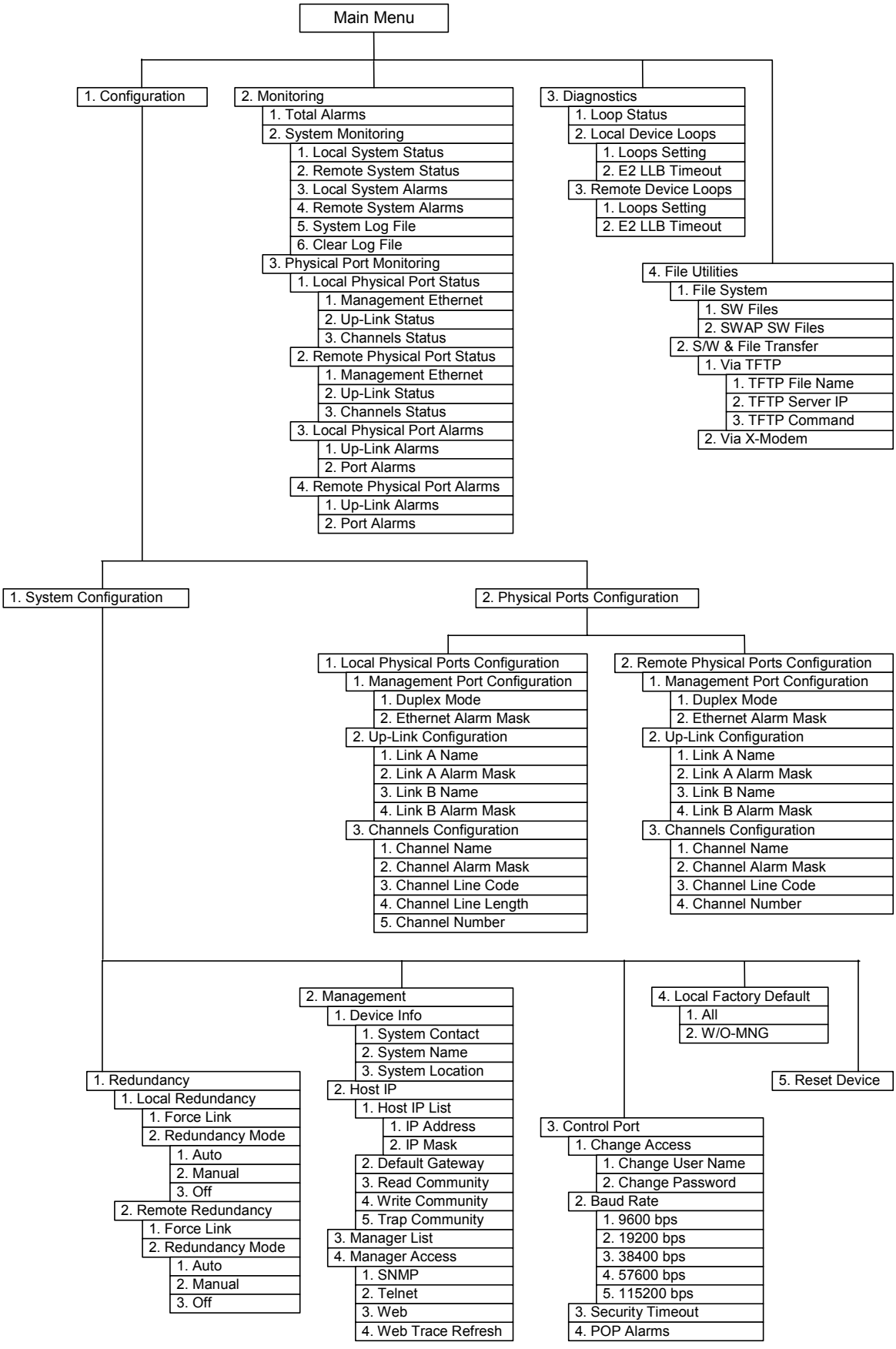


Figure 4-3 MT1000A Menu Map

4.3 Monitoring the System

You can monitor the following aspects of the MT1000A system:

- Local system status
- Remote system status

➤ **To access the monitoring options:**

1. From the Main Menu, choose **Monitoring**.

   The Monitoring menu (*Figure 4-4*) is displayed.

   The **Total Alarms** option displays the total number of alarms that are currently activated.

```
                              MT1000A

Monitoring

 1. Total Alarms                    [ ]
 2. System Monitoring               >
 3. Physical Port Monitoring        >

>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-4. Monitoring Menu

2. To monitor the system, choose **System Monitoring**.

   The System Monitoring menu (*Figure 4-5*) is displayed. This menu is used to monitor various aspects of the system, as described in the sections that follow.

3. To monitor a physical port, choose **Physical Port Monitoring**.

   The Physical Port Monitoring menu (*Figure 4-8*) is displayed. This menu is used to monitor various aspects of the ports, as described in *Monitoring the Physical Ports* on page *4-7*.

```
                              MT1000A

System Monitoring

 1. Local System Status          >
 2. Remote System Status         >
 3. Local System Alarms          [ ]
 4. Remote System Alarms         [ ]
 5. System Log File            [] >
 6. Clear Log File

>

Please select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-5. System Monitoring Menu

On the System Monitoring menu, the Remote System Status and Remote System Alarms options are available only when the MT1000A is connected to a remote device.

Monitoring the Status of the Local System

➤ **To monitor the status of the local system:**

- From the System Monitoring menu, choose **Local System Status**.

  The Local System Status screen (*Figure 4-6*) is displayed. The fields in the Local System Status Screen are described in *Table 4-1*.

```
                                  MT1000A

Local System Status

    Device Type         >  (MT1000A)
    Service Channel     >  (Not Exists)
    Active Link         >  (LINK_A)
    Force Link          >  (LINK_A)
    Redundancy status   >  (Available)
    Redundancy Mode     >  (AUTO)
    SW Version             (3.00)
    HW Version             (0.00)
    BOOT Version           (1.10 Boot img: 4.76)
    PS1 Type            >  (AC)
    PS1 Status          >  (OK)
    PS2 Type            >  (AC)
    PS2 Status          >  (OK)
    MAC Address            (0020d20054dc)
    IP Address on          (172.17.154.64)
    Sys up time            (3 days 05:42:59.50)
    Alarm Indication    >  (Major)
    Test Indication     >  (Off)
>

ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-6. Local System Status Screen

Table 4-1. Local System Status Values

Field	Description
SW Version	Version number of the installed software.
HW Version	Hardware version number.
BOOT Version	The software boot version and the boot manager version installed on the device.
Active link	Identifies the currently active link.
Redundancy status	The redundancy state of the system: • AUTO • MANUAL • OFF.
PS1 Type	The type of power supply for Power Supply 1: • AC—AC power supply • 24VDC—DC power supply • DC-48V—DC power supply • NONE—No power supply is installed in this power supply slot.
PS1 Status	The status of Power Supply 1: • OK • Fault • Not mounted.
PS2 Type	The type of power supply for Power Supply 2: • AC—AC power supply • 24VDC—DC power supply • DC-48V—DC power supply • NONE—No power supply is installed in this power supply slot.
PS2 Status	The status of Power Supply 2: • OK • Fault • Not mounted.
MAC Address	The address the device holds when transmitting frames via the Ethernet port.
IP Address on	The address used when transmitting IP frames via the Ethernet port.
Sys up time	System up time.
Alarm Indication	Current system status: • Normal—System is functioning normally; no alarms activated • Major—One or more major alarms are currently activated • Minor—One or more minor alarms are currently activated.
Test Indication	Indicates whether any tests are currently active in the device: • ON—Tests are currently active in the device • OFF—No tests are currently running.

Monitoring the Status of the Remote System

➤ **To monitor the status of the remote system:**

- From the System menu, choose **Remote System Status**.

  The Remote System Status screen (*Figure 4-7*) is displayed. The fields in this screen have the same meaning as those in the Local System Status screen, described in *Table 4-1*.

```
                              MT1000A

Remote System Status

    Device Type          >  (MT1000A)
    Service Channel      >  (Not Exists)
    Active Link          >  (LINK_A)
    Force Link           >  (LINK_A)
    Redundancy status    >  (Available)
    Redundancy Mode      >  (AUTO)
    SW Version              (1.00)
    HW Version              (0.00)
    PS1 Type             >  (AC)
    PS1 Status           >  (OK)
    PS2 Type             >  (AC)
    PS2 Status           >  (Fault)
    Alarm Indication     >  (Major)
    Test Indication      >  (Off)
>

Please select item <1 to 0>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-7. Remote System Status Screen

4.4 Monitoring the Physical Ports

You can monitor the following aspects of the physical ports on the MT1000A:

- Management port status
- Up-link status
- Channel status.

➤ **To monitor the physical ports:**

1. From the Monitoring menu (*Figure 4-4*), choose **Physical Port Monitoring**.

   The Physical Port Monitoring menu (*Figure 4-8*) is displayed.

```
                              MT1000A

Physical Port Monitoring

 1. Local Physical Port Status          >
 2. Remote Physical Port Status         >
 3. Local Physical Port Alarms       [] >
 4. Remote Physical Port Alarms      [] >


>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-8. Physical Port Monitoring Menu

The Remote Physical Port Status and Remote Physical Port Alarms options are available only when the MT1000A is connected to a remote device.

2. To display the status of ports on the local device, choose **Local Physical Port Status**. To display the status of ports on the remote device, choose **Remote Physical Port Status**. The Local Physical Port Status menu (*Figure 4-9*) or Remote Physical Port Status menu is displayed. The options in the local and remote menus are identical.

```
                              MT1000A

Local Physical Port Status

 1. Management                          >
 2. Up-Link Status                      >
 3. Channels Status                     >


>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-9. Local Physical Port Status Menu

Monitoring the Status of the Ethernet Port

➤ **To monitor the status of the Ethernet port:**

- From the Local/Remote Physical Port Status menu (*Figure 4-9*), choose **Management Ethernet**.

  The Management Ethernet Status screen (*Figure 4-10*) is displayed.

```
                          MT1000A

Management Ethernet Status

     Link Integrity               (No integrity)


>

ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-10. Ethernet Status Screen

The Link Integrity can be one of the following:

- OK—The Ethernet cable has integrity
- No integrity—The Ethernet cable is not connected or some other problem exists.

Monitoring the Status of the Up-Link

➤ **To monitor the status of the up-link:**

- From the Local/Remote Physical Port Status menu (*Figure 4-9*), choose **Up-Link Status**.

  The Up-link Status screen (*Figure 4-11*) is displayed.

```
                          MT1000A

Up-Link Status

    Link A type               >  (Fiber optic)
    Link A status             >  (No alarm)
    Uplink A mode             >  (Multi mode)
    Transmitter type Link A   >  (Laser)
    Wave length Link A        >  (1550 nm)
    Connector type Link A     >  (ST)
    Link B type               >  (Fiber optic)
    Link B status             >  (Signal loss)
    Uplink B mode             >  (Multi mode)
    Transmitter type Link B   >  (Laser)
    Wavelength Link B         >  (1550 nm)
    Connector type Link B     >  (ST)

>

ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-11. Up-Link Status Screen

Monitoring the Status of the Channel Port

➤ **To monitor the status of the channel port:**

- From the Local/Remote Physical Port Status menu (*Figure 4-9*), choose **Channels Status**.

  The Channel Port Status screen *(Figure 4-12*) is displayed.

```
                                MT1000A

Channel Port Status

    Status                  (No alarm)
    Line code               (B8ZS)
    Balance mode            (Balance)

 1. Channel Num          >  (1)


>

Please select item <1 to 1>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-12. Channel Port Status Screen

4.5 Working with the System Log File

Displaying the System Log File

➤ **To display the system log file:**

- From the System Monitoring menu (*Figure 4-5*), choose **System Log File**.

  The System Log File screen (*Figure 4-13*) is displayed.

```
                                MT1000A

System Log File

       Source              Alarm                              Status    Time
  1    Local Main Link     Line AIS occurred                  Major     2:1:13
| 2    Local Device        No connection to remote            Off       5:17:11
| 3    Local CH1           LOS                                Minor     5:19:13
v 4    Local Device        Power supply  A failure            Major     9:1:14
  5    Local Device        Redundancy is not available        Major     13:34:14
  6    Remote Device       Power supply  B failure            Major     15:41:12
  7    Remote Device       Power supply  B failure            Off       16:22:14
  8    Remote CH2          LOS                                Minor     22:3:14
  9    Event               Buffer Overflow                    Event     23:41:14

>

Please select item <1 to 13
ESC-prev.menu; !-main menu; &-exit                                 1 user(s)
```

Figure 4-13. System Log File Screen

Clearing the System Log File

➤ **To remove all entries from the log file:**

1. From the System Monitoring menu (*Figure 4-5*), choose **Clear Log File**.

   A confirmation message appears.

2. Press **Y** to erase the log file.

4.6 Alarms

MT1000A detects fault conditions and initiates alarms and events to alert the user:

- **Alarms** (major and minor) have two statuses: ON and OFF. The alarm status automatically changes to OFF when a fault condition that triggered the alarm is cleared.
- **Events** have only ON status.

Displaying System Alarms

➤ **To display the system alarms:**

- From the System Monitoring menu (*Figure 4-5*), choose **Local System Alarms** or **Remote System Alarms**.

  The Local System Alarms screen (*Figure 4-14*) or Remote System Alarms screen is displayed. The Remote System Alarms screen is similar to the Local System Alarms screen.

```
                              MT1000A

Local System Alarms

    Source        Name                    Num      Severity
Status
 1. Local DEV     PS2 FAIL                2        MAJOR          ON
 2. Local DEV     Remote alarm-DAIS       6        MAJOR          ON


>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-14. Local System Alarms Screen

The Local/Remote System Alarms screen only displays alarms that are currently triggered. Alarms that are currently in the OFF status (not activated) are not displayed.

The MT1000A system alarms are described in *Chapter 5*.

Displaying Physical Port Alarms

➤ **To display the physical port alarms:**

1. From the Physical Port Monitoring menu (*Figure 4-8*), choose **Local Physical Port Alarms** or **Remote Physical Port Alarms**.

   The Physical Port Alarms menu (*Figure 4-15*) for the local or remote MT1000A device is displayed.

```
                                MT1000A

Physical Port Alarms

 1. Up link alarms        [ ]
 2. Port Alarms           [ ]

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-15. Physical Port Alarms Menu

2. To display the up-link alarms, choose **Up link alarms**.

   The Up Link Alarms screen *(Figure 4-16*) is displayed.

```
                                MT1000A

Up Link Alarms

    Source          Name                    Num      Severity       Status
    Local Link B    Signal Loss             21       MAJOR          ON

>

ESC-prev.menu; !-main menu; &-exit                                  1 user(s)
```

Figure 4-16. Up Link Alarms Screen

The Up Link Alarms screen only displays alarms that are currently triggered. Alarms that are currently in the OFF status (not activated) are not displayed.

The MT1000A up-link alarms are described in *Chapter 5*.

3. To display the port alarms, from the Physical Port Alarms menu, choose **Port Alarms**.

   The Port Alarms screen (*Figure 4-17*) is displayed.

```
                                MT1000A

Port Alarms

    Source          Name                    Num       Severity       Status
    Local P-2       Rx AIS                  23        MINOR          ON
    Local P-3       Signal Loss             21        MAJOR          ON

>

ESC-prev.menu; !-main menu; &-exit                                  1 user(s)
```

Figure 4-17. Port Alarms Screen

The Port Alarms screen only displays alarms that are currently triggered. Alarms that are currently in the OFF status (not activated) are not displayed.

The MT1000A port alarms are described in *Chapter 5*.

4.7 Configuring the MT1000A

The use of a terminal enables you to:

- View the configuration of the E1 and E2 interfaces, to identify whether the interfaces are in the normal mode or in the looped mode
- Set local loop connections in the local MT1000A at both E1 and E2 interfaces
- Set local loop connections in the remote MT1000A at both E1 and E2 interfaces
- Set the redundancy mode of the E2 interface
- Set the E1 remote loopback connection
- Reset MT1000A to the default configuration (removing loops and switching to the normal redundancy mode)

Configuring redundancy

➤ **To configure the redundancy between the local and remote devices:**

1. From the Main Menu (*Figure 4-2*), choose **Configuration**.

   The Configuration menu (*Figure 4-18*) is displayed.

```
                              MT1000A

Configuration

 1. System configuration          >
 2. Physical ports configuration  >


>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-18 Configuration Menu

2. Choose **System Configuration**.

   The System Configuration menu (*Figure 4-19*) is displayed.

```
                              MT1000A

System configuration

 1. Redundancy                    >
 2. Management                    >
 3. Control Port                  >
 4. Local Factory Default         >
 5. Reset Device

>

Please select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-19 System Configuration Menu

When the MT1000A is connected to a new-look remote device, the Redundancy option is shown in the menu; otherwise, the Local Redundancy option is shown instead.

3. If the MT1000A is connected to a remote device, choose **Redundancy**.

   The Redundancy menu (*Figure 4-20*) is displayed.

```
                              MT1000A

Redundancy

 1. Local redundancy              >
 2. Remote redundancy             >

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-20. Redundancy Menu

4. To configure redundancy on the local MT1000A, choose **Local Redundancy**.

   The Local Redundancy menu (*Figure 4-21*) is displayed.

```
                              MT1000A

Local Redundancy

 1. Force Link                          (Link A)
 2. Redundancy Mode                >    (Auto)

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-21. Local Redundancy Menu

5. Choose the link for which you want to set redundancy. Choose **Force Link** to toggle the selected Main Link between *Link A* and *Link B*.
6. Choose **Redundancy Mode** to set the mode to use.

   The Redundancy Mode menu (*Figure 4-22*) is displayed.

```
                              MT1000A

Redundancy mode (Auto)

 1. Auto
 2. Manual
 3. Off

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-22. Redundancy Mode Menu

7. Choose the redundancy mode you want to use:
   - **Auto**—When the selected Main Link (for example, Link A) fails, MT1000A will automatically switch over to the backup Main Link (for example, Link B)
   - **Manual**—When the selected Force Link fails, the system switches to the backup link. The backup link remains in use, even if the Force Link returns to service.
   - **Off**—Turns off redundancy. When the selected Main Link fails, MT1000A will not change over to the backup Main Link.

   This completes the setup of redundancy for the local device.
8. To configure redundancy for the remote MT1000A, from the Redundancy menu (*Figure 4-20*), choose **Remote Redundancy**.

   The Remote Redundancy menu appears. This menu is identical to the Local Redundancy menu (*Figure 4-21*).
9. To configure the remote redundancy, refer to the above procedure describing how to configure local redundancy.

Note

You can set the mode for the remote device, which will then perform redundancy according to the status of its links.

Setting the Device Information

Each MT1000A unit can be configured to hold information about the unit, such as its location and a name to easily identify the unit on the network.

➤ **To set device information:**

1. From the System Configuration menu (*Figure 4-19*), choose **Management**.

   The Management menu (*Figure 4-23*) is displayed.

```
                                MT1000A

Management

 1. Device Info                    >
 2. Host IP                        >
 3. Manager List                  []>
 4. Manager Access                 >

>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-23. Management Menu

2. Choose **Device Info**.

   The Device Info menu (*Figure 4-24*) is displayed.

```
                                MT1000A
Device Info

   System Description   ... (MT1000A Hw Version 0.0 SW Version 30)
 1. System Contact      ... ()
 2. System Name         ... ()
 3. System Location     ... ()

>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-24. Device Info Menu

The *System Description* line identifies the device, along with the current hardware and software version numbers.

3. To define a system contact person, choose **System Contact** and then enter the name, phone and/or other details you want to save in this field.
4. To specify a name to identify the MT1000A device, choose **System Name** and then enter the name. It is easier to identify the device by a name than by its IP address.
5. To specify a system location, choose **System Location** and then enter the location of the MT1000A unit.

Setting the network parameters

When you integrate the MT1000A into your network, you will need to set the network parameters of the MT1000A.

➤ **To set the network parameters:**

1. From the Management menu (*Figure 4-23*), choose **Host IP**.

   The Host IP menu (*Figure 4-25*) is displayed.

```
                                MT1000A
Host IP

 1. Host IP List   >
 2. Default Gateway  ... (172.17.161.1)
 3. Read Community   ... (public)
 4. Write Community  ... (public)
 5. Trap Community   ... (public)

>

Please select item <1 to 5>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-25. Host IP Menu

2. Choose **Host IP List**.

   The Host IP List menu (*Figure 4-26*) is displayed.

```
                              MT1000A
Host IP List

 1. IP Address      ... (172.17.161.93)
 2. IP Mask          ... (255.255.255.0)

>
Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit
1 user(s)
```

Figure 4-26. Host IP List Menu

3. To set the IP address of the MT1000A unit, choose **IP Address** and then enter the IP address.
4. To set the IP Mask, choose **IP Mask** and then enter the IP mask.
5. To set the default gateway, from the Host IP menu (*Figure 4-25*), choose **Default Gateway** and then enter the IP address of the gateway.
6. From the Host IP menu, choose **Read Community** and then set the read community. This field is used by SNMP. Specify a string of eight characters.
7. From the Host IP menu, choose **Write Community** and then set the read community. This field is used by SNMP. Specify a string of eight characters.
8. From the Host IP menu, choose **Trap Community** and then set the read community. This field is used by SNMP. Specify a string of eight characters.

Setting up the Manager List

By default, any remote management terminal is allowed to change the configuration of the MT1000A. You may enhance the security of the site by limiting remote management to specific management terminals or nodes. The Manager List lists the network nodes from which management may take place.

➤ **To define the manager list:**

1. From the Management menu (*Figure 4-23*), choose **Manager List**.

   The Manager List screen (*Figure 4-27*) is displayed.

```
                              MT1000A
Manager List

    mngNum          mngIP            mngMask
     1              0.0.0.0             NO
|    2              0.0.0.0             NO
|    3              0.0.0.0             NO
v    4              0.0.0.0             NO
     5              0.0.0.0             NO

 1. Change cell                    ... (0.0.0.0)

>

ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-27. Manager List Screen

2. The list contains 10 entries. Press **D** to move down the list; press **U** to move up the list. Press **L** to select the previous field; press **R** to select the next field.
3. To change the value of a field, select the field (it will appear highlighted), then choose **Change Cell** and then enter the new value.

   When the mngMask field is set to **Yes**, a trap is sent to this agent.

Setting the Management Access

➤ **To set the management access:**

1. From the Management menu (*Figure 4-23*), choose **Manager Access**.

   The Manager Access menu (*Figure 4-28*) is displayed.

```
                              MT1000A
Manager Access

 1. Telnet          >
 2. SNMP            >
 3. Web             >
 4. Web Trace Refresh (seconds)[1-255] ... (10)
>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-28. Manager Access Menu

2. Choose the method to use for management access:
   - **SNMP** (the management terminal connects to the MT1000A via SNMP connection)
   - **Telnet** (the management terminal connects to the MT1000A via Telnet connection)
   - **Web** (the management terminal connects to the MT1000A via Web connection)

   The menu shown in the following figure is displayed. The title of the menu indicates which management access option is being configured. While the Telnet menu is shown in the figure, the menu options are the same for all management access modes.

```
                              MT1000A
Telnet

 1. Disable
 2. Enable
 3. Managers only
>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-29. Telnet Menu

3. Choose **Enable** to enable this access mode; choose **Disable** to disable this access mode. Choose **Managers only** to provide management access only to those users whose IP addresses appear in the Manager List.
4. When the Web management access method is selected, set the **Web Trace Refresh** (1-155 seconds) in the Manger Access menu. This option is available only when Web access is enabled.

Setting the User Name and Password

To enhance security, you can specify a user name and password to control access to the MT1000A management functions.

➤ **To set user name and password:**

1. From the System Configuration menu (*Figure 4-19*), choose **Control Port**.

   The Control Port menu (*Figure 4-30*) is displayed.

```
                            MT1000A
Control Port

 1. Change Access        >
 2. Baud Rate            >   (19200bps)
 3. Security Timeout         (10min)
 4. POP Alarms           >   (OFF)
>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-30. Control Port Menu

2. Choose **Change Access**.

   The Change Access menu (*Figure 4-31*) is displayed.

```
                              MT1000A
Change Access

 1. Change User Name               ... (user)
 2. Change Password                ... ()
>
Please select item <1 to 2>

ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-31. Change Access Menu

3. To change the user name, choose **Change User Name** and then enter the new user name.
4. To change the password, choose **Change Password** and then enter the new password. The new password may contain up to eight characters.

Configuring the Control Port

The control port is used to connect a console terminal to the MT1000A device.

➤ **To configure the control port:**

1. From the Control Port menu (*Figure 4-30*), choose **Baud Rate**.

   The Baud Rate menu (*Figure 4-32*) is displayed.

```
                              MT1000A

Baud Rate     (9600bps)

 1. 9600 bps
 2. 19200 bps
 3. 38400 bps
 4. 57600 bps
 5. 115200 bps

>

Please select item <1 to 5>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-32. Baud Rate Menu

2. Choose the baud rate that matches your management terminal device.
3. From the Control Port menu, choose **Security Timeout**, and then enter a timeout value in minutes. This value is the number of minutes of management inactivity after which the MT1000A automatically disconnects from the management session. To reconnect, press **<Enter>** on the management terminal and then log in again.
4. Choose **POP Alarms** to toggle POP Alarms ON or OFF. When POP Alarms is ON, new alarms appear at the bottom of the terminal screen. Regardless of the POP Alarms setting, the alarms are written to the log file.

Resetting the Factory Defaults

You can reset all of the local MT1000A configuration parameters to their default settings, or you can reset all parameters except for the management settings (IP addresses)

➤ **To reset parameters to the factory defaults:**

1. From the System Configuration menu (*Figure 4-19*), choose **Local Factory Default**.

   The Factory Default menu (*Figure 4-33*) is displayed.

```
                                MT1000A

Factory Default
 1.    All
 2.    W/O-MNG>

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                          1 user(s)
```

Figure 4-33. Factory Default Menu

2. To reset all parameters to the factory default, choose **All**.
3. To reset all parameters except for the management information to the factory default, choose **W/O-MNG**.

   A confirmation message is displayed.
4. Enter **Y** (Yes) to confirm the reset operation.

Resetting the MT1000A

➤ **To reset the MT1000A:**

1. From the System Configuration menu (*Figure 4-19*), choose **Reset Device**.

   A confirmation message is displayed.
2. Enter **Y** (Yes) to reset the device.

4.8 Configuring the Physical Ports

Configuring the Ethernet Port

➤ **To configure the Ethernet port:**

1. From the Configuration menu (*Figure 4-18*), choose **Physical Ports Configuration**.

   The Physical Ports Configuration menu (*Figure 4-34*) is displayed.

```
                              MT1000A

Physical ports configuration

 1. Local Physical Ports Configuration      >
 2. Remote Physical Ports Configuration     >

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-34. Physical Ports Configuration Menu

The Remote Physical Ports Configuration option is shown only when a remote MT1000A device is connected.

2. Choose **Local Physical Ports Configuration** or **Remote Physical Ports Configuration**.

   The Local Physical Ports Configuration screen (*Figure 4-35*) or Remote Physical Ports Configuration screen is displayed. The Remote Physical Ports Configuration screen is identical to the Local Physical Ports Configuration screen.

```
                              MT1000A

Local Physical Ports Configuration

 1. Management Port Configuration   >
 2. Up Links Configuration          >
 3. Channels Configuration          >

>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-35. Local Physical Ports Configuration Menu

3. Choose **Management Port Configuration**.

   The Management Port Configuration screen (*Figure 4-36*) is displayed.

```
                              MT1000A

Management Port Configuration

 1. Duplex Mode                     (Full)
 2. Ethernet alarm mask             (On)

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-36. Management Port Configuration Screen

4. Choose **Duplex Mode** to toggle through the available modes:

- **Full** (Full-duplex mode)
- **Half** (Half-duplex mode).

5. Choose **Ethernet alarm mask** to toggle the Ethernet alarm on or off.

Configuring the Channels

➤ **To configure the channels:**

1. From the Local/Remote Physical Ports Configuration menu (*Figure 4-35*), choose **Channels Configuration**.

   The Channels Configuration screen (*Figure 4-37*) is displayed.

```
                                MT1000A

Channels Configuration

 1. Channel name           ... ( )
 2. Channel alarm mask         (Off)
 3. Channel line code          (B8ZS)
 4. Channel line length        (0-133 ft)
 5. Channel Number             (1)

>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-37. Channels Configuration Screen

2. Choose **Channel Number** and then enter the number of the channel you want to configure.
3. If you would like to specify a name to help identify the channel, choose **Channel name** and then enter the name (a text string).
4. Choose **Channel alarm mask** to toggle the alarm for this channel on or off.
5. Choose **Channel line code** to toggle the line code. Note that changing the line coding for one channel changes it for all four channels. The following line codes are available:
   - B8ZS
   - AMI
6. To change the channel line length value, choose **Channel line length** and then choose the desired value.

Configuring the Up-Links

➤ **To configure the up-links:**

1. From the Local/Remote Physical Ports Configuration menu (*Figure 4-35*), choose **Up-Link Configuration**.

   The Up-Link Configuration screen (*Figure 4-38*) is displayed.

```
                              MT1000A

Up-link Configuration

 1. Link A name                ... ( )
 2. Link A alarm mask              (Off)
 3. Link B name                ... ( )
 4. Link B alarm mask              (Off)

>

Please select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-38. Up-Link Configuration Screen

2. If you would like to specify a name to easily identify Link A, choose **Link A name** and then enter a name for the link.
3. Choose **Link A alarm mask** to toggle the alarm for Link A on or off.
4. If you would like to specify a name to easily identify Link B, choose **Link B name** and then enter a name for the link.
5. Choose **Link B alarm mask** to toggle the alarm for Link B on or off.

4.9 Diagnostics

Setting the E2 Local Loopback Timeout

The E2 local loopback (LLB) timeout can be set for the local device and the remote device.

➤ **To set the E2 LLB local loopback timeout on the local MT1000A:**

1. From the Main Menu (*Figure 4-2*), choose **Diagnostics**.

   The Diagnostics menu (*Figure 4-39*) is displayed.

```
                              MT1000A

Diagnostics

 1. Loop Status            >
 2. Local Device Loops     >
 3. Remote Device Loops    >

>

Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-39. Diagnostics Menu

The *Remote Device Loops* option is displayed only if a remote device is connected to the MT1000A.

2. Choose **Local Device Loops**.

   The Local Device Loops Menu (*Figure 4-40*) is displayed.

```
                                MT1000A

Local Device Loops

 1. Loops Setting            []  >
 2. Uplink LLB timeout (min)     ... (5)

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-40. Local Device Loops Menu

3. Choose **Uplink LLB Timeout** and then enter the timeout in minutes. The value you specify is the duration of the E2 LLB loopback test. Specify a value as follows:
   - 0 (forever)
   - 1-255 (test runs for the specified number of minutes).

➤ **To set the E1 LLB local loopback timeout on the remote MT1000A:**

1. From the Diagnostics menu (*Figure 4-39*), choose **Remote Device Loops**.

   The Remote Device Loops menu is displayed. This menu is the same as the Local Device Loops menu (*Figure 4-40*). Set the loopback as described above for the setting the timeout on the local MT1000A.

Setting Loopbacks in the Local MT1000A

➤ **To set loopbacks in the local MT1000A:**

1. From the Local Device Loops menu (*Figure 4-40*), choose **Loops Setting**.

   The Loops Setting screen (*Figure 4-41*) is displayed.

```
                                MT1000A

Loops Setting

    Port                  Loop status
    Uplink                  LLB
    Channel 1               No loop
    Channel 2               No loop
    Channel 3               No loop
    Channel 4               No loop

 1. No loop
 2. LLB
 3. RLB

>
Please select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-41. Loops Setting Screen

2. Highlight the *Loop status* field of the channel you want to change.
3. Enter the loopback status you want to set:
   - **No loop**—No loopback on the channel
   - **LLB**—Local loopback on the channel or uplink
   - **RLB**—Remote loopback on the channel.

   See *Chapter 5* for definitions of local channel and uplink loopbacks in the remote MT1000A.

   The loopback test begins running immediately after a loopback has been set.

Setting Loopbacks in the Remote MT1000A

➤ **To set loopbacks in the remote MT1000A:**

1. From the Diagnostics menu, choose **Remote Device Loops**.

   The Remote Device Loops menu is displayed. This menu is the same as the Local Device Loops menu (*Figure 4-40*).
2. From the Remote Device Loops menu, choose **Loops Setting**.

   The Loops Setting screen (*Figure 4-41*) is displayed.
3. Highlight the *Loop status* field of the channel you want to change.
4. Enter the loopback status you want to set:
   - **No loop**—No loopback on the channel
   - **LLB**—Local loopback on the channel or uplink
   - **RLB**—Remote loopback on the channel.

   See *Chapter 5* for definitions of local channel and uplink loopbacks in the remote MT1000A.

   The loopback test begins running immediately after a loopback has been set.

Caution Setting the uplink local loopback in the remote MT1000A disconnects the link, and as such, is irreversible. To remove this loopback, connect a terminal to the remote unit or shut down the power to the remote unit. If you set the Uplink LLB timeout on the remote MT1000A, the loopback test will stop after the specified timeout period.

Displaying Loop Status

➤ **To display the current status of loops you have configured in the system:**

1. Open the Diagnostics menu (*Figure 4-39*).
2. Choose **Loop Status**.

   The status of all loops currently configured on the local MT1000A is displayed.

4.10 Viewing Hardware and Software Updates

➤ **To view the last MT1000A hardware and software updates:**

1. From the Main Menu (*Figure 4-2*), choose **Monitoring**.

   The Monitoring menu (*Figure 4-4*) is displayed.

2. Choose **System Monitoring**.

   The System Monitoring menu (*Figure 4-5*) is displayed.

3. Choose **Local System Status** to display the status of the local MT1000A, or choose **Remote System Status** to display the status of the remote MT1000A.

   The Local System Status screen (*Figure 4-6*) is displayed. The first line of information in the screen displays the current hardware and software version numbers.

4.11 Downloading Software

Whenever a new software release is available, you should download it onto the MT1000A. The MT1000A stores up to two versions of the software – each one is a separate partition. You can choose which partition to boot from.

Software can be downloaded using the TFTP or X-Modem protocol.

Downloading Software using the TFTP Protocol

➤ **To download a new software revision via TFTP:**

1. From the Main Menu (*Figure 4-2*), choose **File Utilities**.

   The File Utilities menu (*Figure 4-42*) is displayed.

```
                              MT1000A

File Utilities

 1. File System          >
 2. S/W &File Transfer   >

Please select item <1 to 2>

ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-42. File Utilities Menu

2. Choose **S/W & File Transfer**.

   The S/W & File Transfer menu (*Figure 4-43*) is displayed.

```
                              MT1000A

S/W & File Transfer

 1. Via TFTP          >
 2. Via X-Modem

Please select item <1 to 2>

ESC-prev.menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-43. S/W & File Transfer Menu

3. Choose **Via TFTP**.

   The Via TFTP menu (Figure 4-44) is displayed.

Note *The Via TFTP option is available only if the local MT1000A has been assigned an IP address.*

```
                              MT1000A

Via TFTP

   Transfer Status                    >   (No operation)
   Transfer Error                     >   (No Error)
 1. TFTP File Name                        (File Name)
 2. TFTP Server IP                        (0.0.0.0)
 3. TFTP Command

>

Please select item <1 to 3>

ESC-prev.menu; !-main menu; &-exit                       1 user(s)
```

Figure 4-44. Via TFTP Menu

4. Choose **TFTP Server IP** and enter the IP address of the server from which you want to download the new software file.
5. Choose **TFTP File Name** and enter the name of the file you want to download.
6. Choose **TFTP Command**.

   The download process begins.

   The Transfer Status field indicates the current status of the download:

   - No operation (no TFTP transfer is in process)
   - Connecting (initiating a TFTP connection)
   - Transferring data (TFTP data transfer is in process)
   - Ended timeout (the download was terminated because the Retry Timeout or Total Timeout was exceeded)
   - Ended OK (the file was successfully downloaded)
   - Error (the download was terminated because an error occurred).

Downloading Software using the X-Modem Protocol

➤ **To download a new software version via X-Modem:**

1. Open the S/W & File Transfer menu (*Figure 4-43*).
2. Choose **Via X-Modem**.

   The download process begins as soon as the remote computer starts the upload process. Note that you need to run an X-Modem application on the remote computer to invoke the upload.

4.12 Viewing file and file system information

➤ **To view information about the file system:**

1. From the File Utilities menu (*Figure 4-42*), choose **File System**.

   The File System menu (*Figure 4-45*) is displayed.

```
                              MT1000A

File System

 1. SW Files                [] >
 2. SWAP SW Files

>

Please select item <1 to 2>

ESC-prev.menu; !-main menu; &-exit                        1 user(s)
```

Figure 4-45. File System Menu

2. Choose **SW Files**.

   The SW Files screen (*Figure 4-46*) is displayed, showing information about the active and backup software partitions as well as the boot version.

```
                              MT1000A

SW Files

    Software active version                  1.00
    Software active partition                0
    Code size                                190
    Date                                     01-01-02
    Software backup version                  0.00n00
    Software backup partition                1
    Code size                                0
    Date                                     0-0-0
    Boot version                             2.20
    Boot mng version                         4.00

>

ESC-prev.menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-46. SW Files Screen

➤ **To change the software boot partition:**

1. Open the File System menu (*Figure 4-45*).
2. To swap the active and backup software partitions, choose **SWAP SW Files**.
   The MT1000A reboots off the other partition.
3. After the system has come up, display the SW Files screen to verify that the change took place.

Chapter 5
Testing and Diagnostics

5.1 Introduction

This chapter includes a description of the MT1000A diagnostic tests and troubleshooting procedures.

5.2 Troubleshooting

In case a problem occurs, check the displayed indications and refer to *Section 3-2* and *Table 3-1* for their interpretation.

Identify the trouble symptoms and perform the actions listed under Corrective Measures in the order given in *Table 5-1*, until the problem is corrected.

Table 5-1 Troubleshooting Chart

Trouble Symptoms	Probable Cause	Corrective Measures
The MT1000A does not respond	No power	Check that both ends of the power cable are properly connected. If power cable is properly connected, but the power supply still does not respond, then the power supply is defective (see below). If the MT1000A is powered from a DC power source, check the polarity of the power connections.
	Defective Power Supply	Disconnect the power from both ends and replace with another power supply.
	Defective MT1000A	Replace the MT1000A.
One of the PWR indicators lights in red.	Defective power supply	Turn the respective power supply off for at least 10 minutes, and then turn it on again. If the PWR indicator is still red, have the MT1000A repaired as soon as possible.

Table 5-1. Troubleshooting Chart (Cont.)

Trouble Symptoms	Probable Cause	Corrective Measures
The SYNC LOSS indicator of the fiber optic link lights.	External problem	Activate the local loopback on the MT1000A. Check that the SYNC LOSS and AIS indicators of the fiber optic link in use turn OFF. If the indicators turn off, check the fiber optic interface connections, the fiber optic transmission path to the remote unit, and the remote unit.
	Defective MT1000A	Replace the MT1000A.
The AIS indicator of the fiber optic link lights.	1. External	The remote equipment connected to the fiber optic link of the MT1000A sends an AIS sequence. Check the remote equipment.
	2. Defective MT1000A	Activate the local loopback on the MT1000A. Check that the SYNC LOSS and AIS indicators of the fiber optic link in use turn OFF. If one of the indicators remains lit, replace the MT1000A.
None of the units connected to a local MT1000A receive the remote equipment.	External problem	Activate the local loopback on the MT1000A. Check that all the SYNC LOSS and AIS indicators turn OFF, and that the equipment connected to the local tributaries receive their own transmissions. If the indicators turn OFF, the problem is external. Troubleshoot the remote unit, and the fiber optic transmission path.
	Defective MT1000A	Replace the MT1000A.
Only one of the units connected to a local MT1000A does not receive the remote equipment.	1. Equipment problem	Check the equipment connected to the local tributary, and its cable connections. Check the remote tributary equipment.
	2. Defective MT1000A	Activate the fiber optic link local loopback in the local MT1000A. Check that any previously lit alarm indicators related to the tributary turn OFF. If the indicator turns OFF, the problem is external; if the indicator remains lit, replace the MT1000A.
No menus are available.	Incomplete downloading of new FLASH version	Turn the MT1000A ON and proceed to download the new FLASH version again.

5.3 List of Alarms and Events

The MT1000A alarms are described in Table 5-2.

Table 5-2. MT1000A System Alarms

Message on terminal	Description	Severity
CDP fail	A failure has occurred in the CDP.	Major
FLASH problem	A problem occurred in the device FLASH device. Could not save user configuration.	Major
PS1 FAIL	Power supply A has failed.	Major
PS2 FAIL	Power supply B has failed.	Major
Redundancy not available	Unable to activate redundancy between the uplinks. This alarm occurs only if the redundancy mode is set to AUTO or MANUAL.	Major
Remote alarm-DAIS	Received a Demux AIS.	Major
Remote connection FAIL	A managment connection could not be established with the remote device.	Major

Table 5-3. MT1000A Port and Up-Link Alarms

Message on terminal	Description	Severity
ETH Integrity fail	The managment port is not connected.	Major
Incorrect Tributary Freq	There is a problem with the tributary frequency.	Major
Looped	Loop detected on the uplinks.	Major
Loss of frame	Loss of frames on the uplinks.	Major
Rx AIS	Received AIS on the uplinks or the channels.	Minor
Signal Loss	Signal loss detected on uplinks or channels.	Major

The MT1000A events are described in Table 5-4.

Table 5-4. MT1000A Events

Event	Description
BUFFER OVERFLOW	The log file overran the last events.
LOGIN SWITCH ON	User changed access name.
PASSWORD SWITCH ON	User changes access password.
SW DOWNLOAD FAIL	Software download failed.
SW DOWNLOAD OFF	Software download process finished.
SW DOWNLOAD ON	Software download is in process.
Uplink switch A->B	Switched from uplink A to uplink B – reason unknown.
Uplink switch A->B:LOOPED	Switched from uplink A to uplink B – loop detected in uplink A.
Uplink switch A->B:LOSS	Switched from uplink A to uplink B – LOSS in uplink A.
Uplink switch A->B:OOF	Switched from uplink A to uplink B – out of frames in uplink A.
Uplink switch A->B:USER	Switched from uplink A to uplink B – user request.
Uplink switch B->A	Switched from uplink B to uplink A – reason unknown.
Uplink switch B->A:LOOPED	Switched from uplink B to uplink A – loop detected in uplink B.
Uplink switch B->A:LOSS	Switched from uplink B to uplink A – LOSS in uplink B.
Uplink switch B->A:OOF	Switched from uplink B to uplink A – out of frames in uplink B.
Uplink switch B->A:USER	Switched from uplink B to uplink A – user request.

5.4 Diagnostic Tests

MT1000A supports the following types of loopback connections:

- Loopbacks toward the local MT1000A
- Loopbacks toward the remote MT1000A.

The test functions are controlled by the management software. During all loopbacks, the TST indicator lights up on the units that participate in the loopback path.

The available loopback functions are described in the following paragraphs.

Local Loopbacks in the MT1000A

You can set two types of local loopback connections in the MT1000A unit:

- T1 local, which is set for each T1 interface separately from a terminal.
- Fiber optic link local, which can be set from a terminal.

T1 Local Loopback in the MT1000A

The T1 local loopback returns the T1 transmit signal to the output of the receive path. Simultaneously, an unframed all-ones signal is sent to the MUX. *Figure 5-1* shows the T1 local loopback connection.

This test checks the operation of the connections to the equipment attached to the local tributary interfaces.

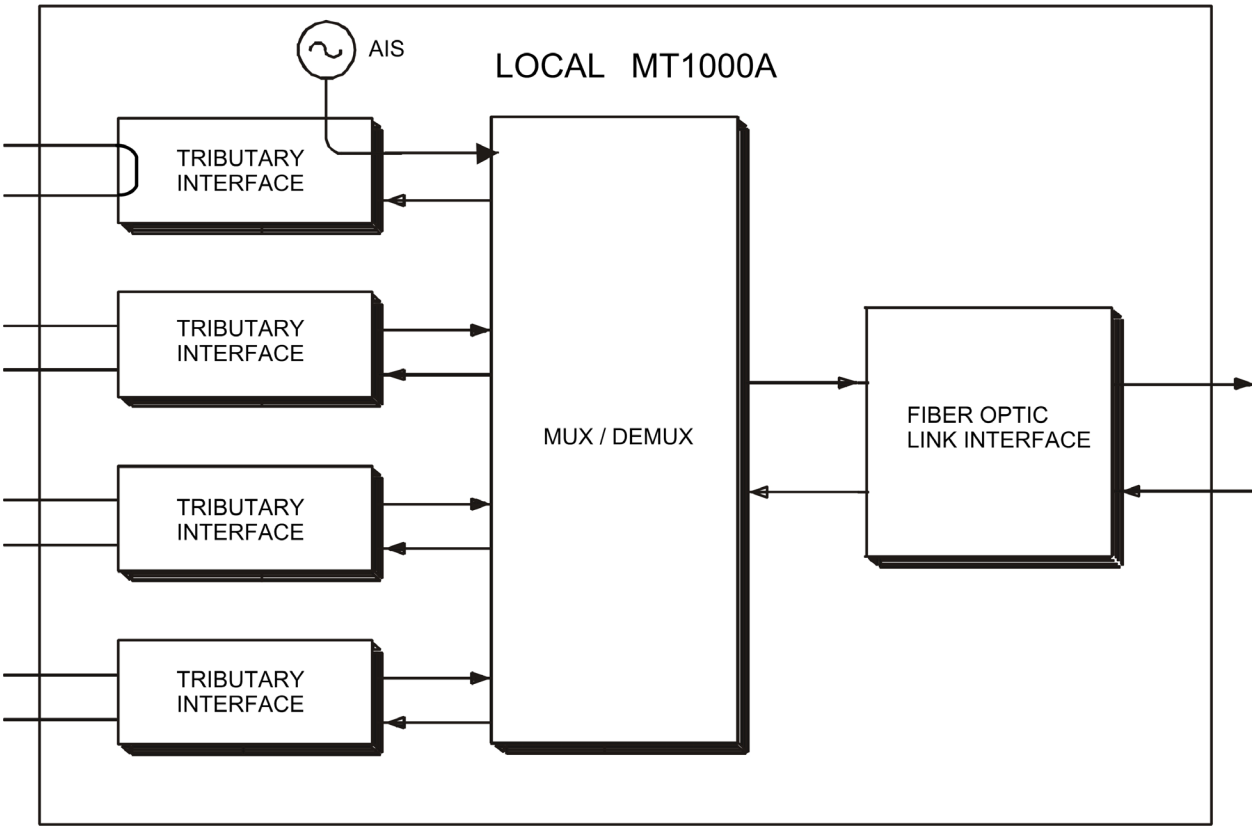


Figure 5-1 T1 Local Loopback in the MT1000A

Fiber Optic Link Local Loopback in the MT1000A

The fiber optic local loopback returns the transmit signal of the active fiber optic link interface to the input of the receive path. Simultaneously, the local MT1000A sends an unframed all-ones signal to the fiber optic link. *Figure 5-2* shows the fiber optic link local loopback connection.

When this loopback is activated, the equipment connected to the local MT1000A tributary must receive its own transmission.

This test checks the operation of the local MT1000A, and the connections to the equipment attached to the tributary interfaces.

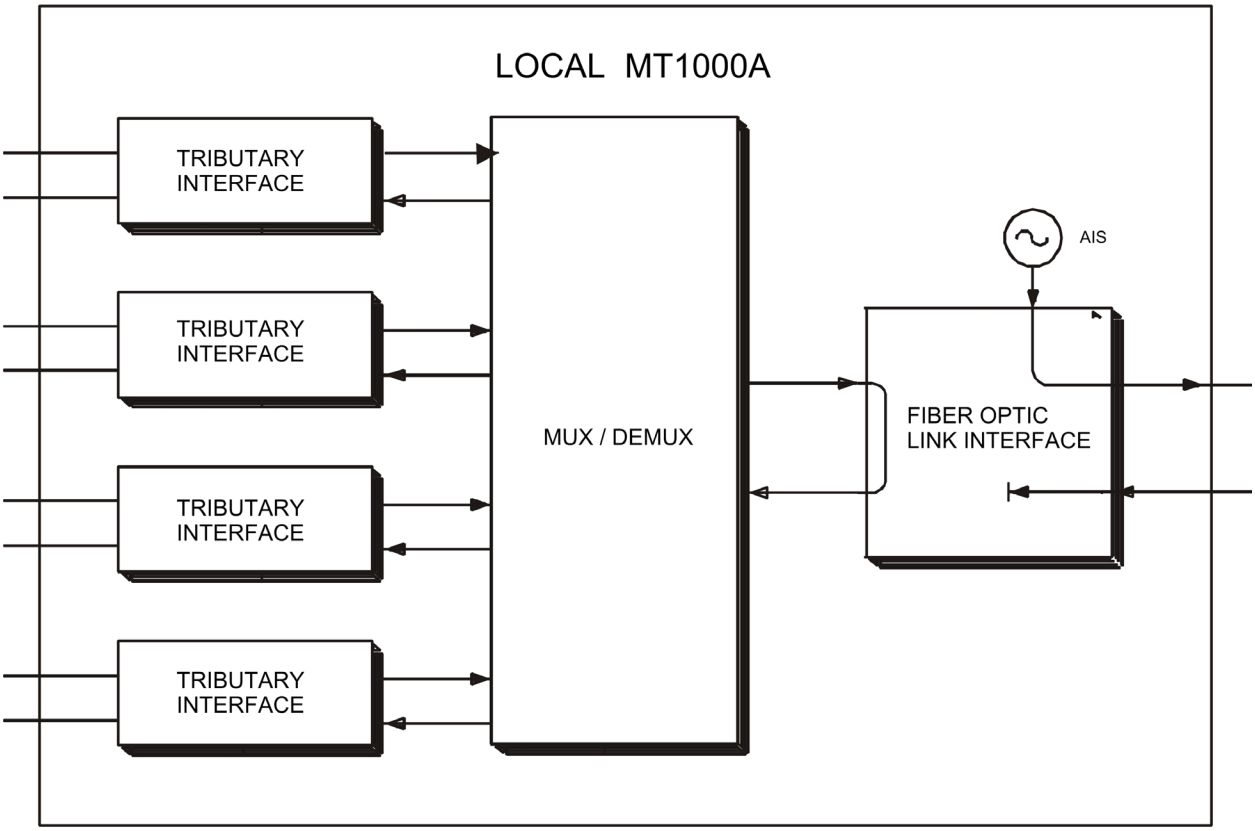


Figure 5-2 Fiber optic Link Local Loopback in the MT1000A

Remote Loopbacks in the MT1000A

You can set two types of remote loopback connections in the MT1000A unit:

- T1 remote, which is set for each T1 interface separately, from the terminal.
- Fiber optic link remote, which can be set from the terminal.

T1 Remote Loopback in the MT1000A

The T1 remote loopback returns the transmitted Demuxed T1 to the receiver Mux. Simultaneously, the MT1000A sends an unframed all-ones signal to the T1 link.

Figure 5-3 shows the T1 remote loopback connection.

This test checks the operation of the local MT1000A and the connection to the remote MT1000A unit.

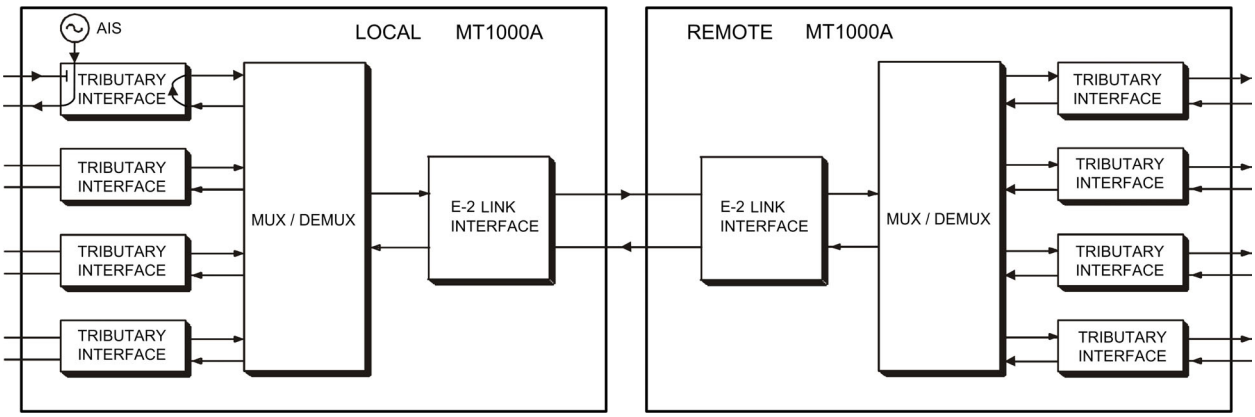


Figure 5-3 T1 Remote Loopback in the MT1000A

Fiber Optic Remote Loopback in the MT1000A

The fiber optic remote loopback returns the received signal of the active fiber optic link interface to the input of the transmit path. Simultaneously, the remote MT1000A sends an unframed all-ones signal to the input of the Demux.

Figure 5-4 shows the fiber optic remote loopback connection.

This test checks the operation of the local MT1000A and the connection to the remote MT1000A.

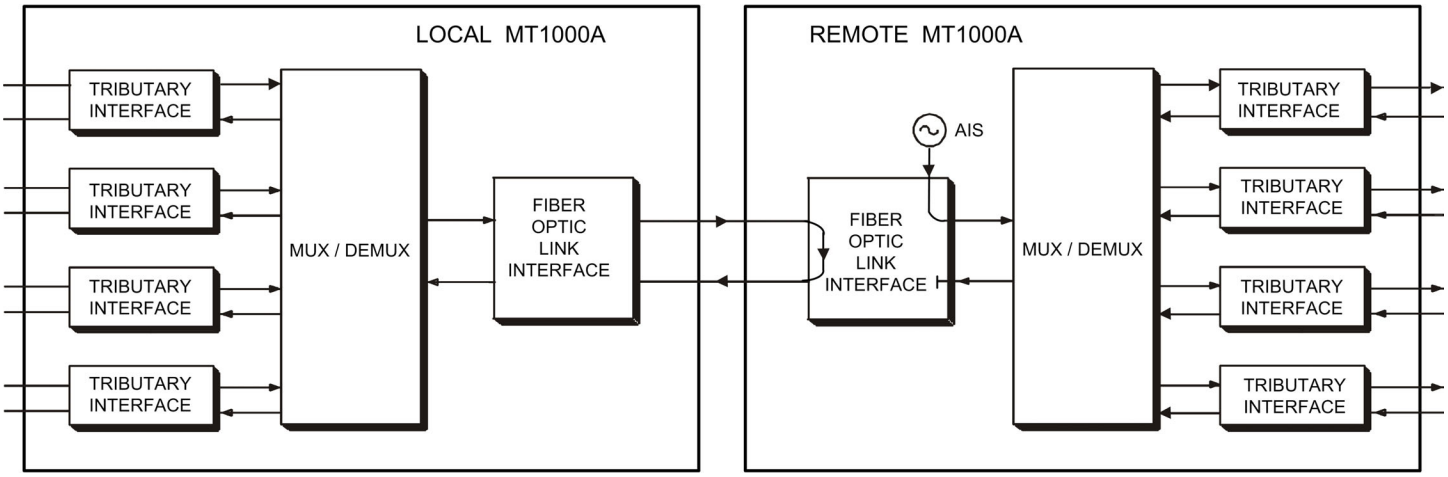


Figure 5-4 Fiber Optic Remote Loopback in the MT1000A

Appendix A
Interface Specifications

A.1 Tributary Connectors

Each tributary interface has one RJ-45 eight-pin connector. Connector wiring is listed in *Table A-1*.

Table A-1. RJ-45 Tributary Connector, Pin Functions

Pin	Designation	Direction	Function
1	RD(T)	Input	Receive Data (tip)
2	RD(R)	Input	Receive Data (ring)
4	TD(T)	Output	Transmit Data (tip)
5	TD(R)	Output	Transmit Data (ring)
3, 6, 7, 8	-	N/A	Not connected

A.2 Alarm Connector

The MT1000A ALARM connector is a 9-pin female connector, which includes the contacts of the major and minor alarm relays. *Figure A-1* shows the pin functions. The relay positions are shown in the non-energized (alarm active) state.

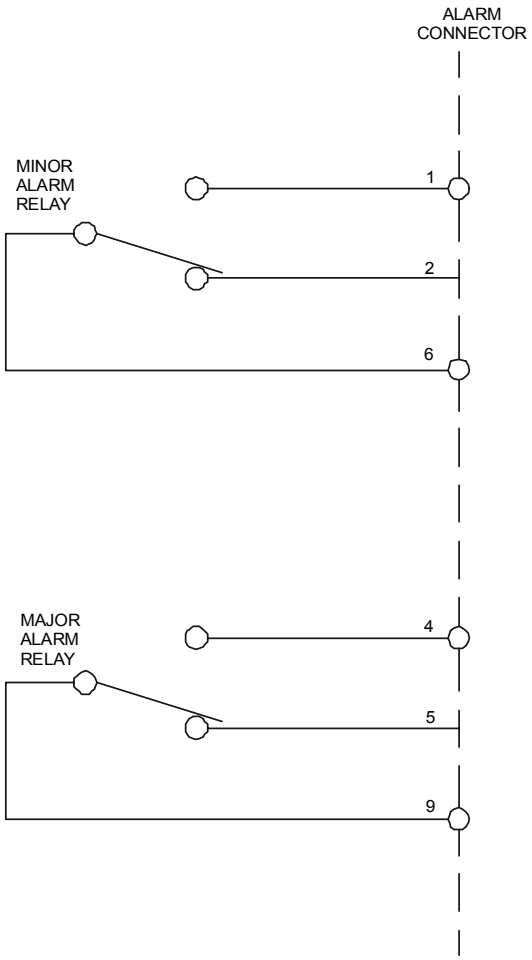


Figure A-1. ALARM Connector Wiring

A.3 Control Connector

The optional MT1000A supervisory port has a standard RS-232 DTE interface. The physical interface is a 9-pin female connector, designated CONTROL. Connector wiring is given in *Table A-2*.

Table A-2. CONTROL DTE Connector, Pin Functions

Pin	Line	Direction	Remarks
1	Data Carrier Detect (DCD)	To MT1000A	
2	Receive Data (RD)	To MT1000A	
3	Transmit Data (TD)	From MT1000A	
4	Data Terminal Ready (DTR)	From MT1000A	
5	Signal Ground (SIG)	Common signal reference and DC power supply ground	
6	Data Set Ready (DSR)	To MT1000A	(Not used)
7	Request to Send (RTS)	From MT1000A	
8	Clear to Send (CTS)	To MT1000A	
9	Ring Indicator (RI)	To MT1000A	(Not used)

A.4 MNG-ETH Connector

One LAN Ethernet RJ-45 connector is mounted on the MNG-ETH module. The pinout is shown in *Table A-3*.

Table A-3. Ethernet RJ-45 Connector Pin Assignment

Pin	Designation	Function	Direction
1	RX+	Receive – positive lead	Input
2	RX-	Receive – negative lead	Input
3	TX+	Transmit – positive lead	Output
6	TX-	Transmit – negative lead	Output
4, 5, 7, 8	-	Not connected	-

A.5 Power Connectors

The power connector used for the AC/DC power supply is a standard square 3-prong female connector.

For information on the DC power connector, refer to the two supplements at the end of this manual: ***DC Power Supply Connection - Terminal Block Connector Supplement*** and the ***DC Power Supply Connection - AC/DC Adaptor (AD) Plug Supplement.***

Appendix B

MT1000A MIBs

A MIB (Management Information Base) is a database of managed objects. The MIB contains the data regarding the network elements being controlled and monitored. Each characteristic of the element to manage is defined as an object in the MIB. The MIB is a hierarchical tree structure that acts as the repository for defined objects. Each object has an object name, a type, syntax, an access code (read-write, read-only, not-accessible, and write-only), and a status (mandatory, optional, obsolete).

MT1000A supports appropriate groups (tables) of MIB II (SNMP standard MIB) and some other MIBs, as shown in *Table B-1*.

Table B-1. MT1000A MIBs

MIB	Notes	Tables
RFC1213	MIB-11	system if at ip icmp udp snmp
RFC1573	New Interface Table	–
RFC1406 NG	Partially supported	dsx1ConfigTable

Index

—A—
AC/DC connections, 2-8
AIS, 1-5
alarm connector
  specifications, 1-8
alarm relays
  connector, 2-7
alarms, 1-5, 4-11
  connector, A-2
  physical port, 4-12
  port, 5-3
  system, 4-11, 5-3
  Up-Link, 5-3
applications, 1-2
automatic switching, 1-4

—B—
Baud Rate menu, 4-20
boards, 1-3

—C—
Change Access menu, 4-20
changing software boot partition, 4-30
channel port
  Channel Port Status screen, 4-9
  monitoring the status, 4-9
channels
  Channels Configuration screen, 4-23
  configuring, 4-23
  up-links, 4-23
circuit boards, 1-3
clearance
  front panel, 2-2
  rear panel, 2-2
Configuration menu, 4-13
configuring, 4-1
  channels, 4-23
  control port, 4-20
  Ethernet port, 4-21
  physical ports, 4-21
  redundancy, 4-13
  up-links, 4-23
connections, 2-6
  AC/DC power supply, 2-8
  alarm relays, 2-7
  DC power, 2-8
  fiber optic, 2-2
  fiber optic interface, 2-7
  ground, 2-7
  power supply, 2-7
  tributary, 2-1
  tributary channels, 2-6
connector
  alarms, A-2
  control, A-3
  Ethernet, A-3
  locations, 2-6
  power, A-4
control connectors, A-3
control DTE supervisory port
  specifications, 1-8
control port
  configuring, 4-20
  Control Port menu, 4-19

—D—
DC connections, 2-8
depth, 1-8
device
  resetting, 4-21
device information
  Device Info menu, 4-16
  setting, 4-16
diagnostics, 1-5, 4-24, 5-1
  Diagnostics menu, 4-24
  tests, 5-4
displaying
  loop status, 4-26
  physical port alarms, 4-12
  system alarms, 4-11
  system log file, 4-10
downloading
  software, 4-27
  software using X-Modem protocol, 4-29
  software via TFTP protocol, 4-27

—E—
entering the terminal session, 4-2
environment specifications, 1-9
equipment, 2-2
Ethernet port
  configuring, 4-21
  monitoring the status, 4-8
events, 4-11, 5-3, 5-4

—F—
factory defaults
Factory Default menu, 4-21
resetting, 4-21
features, 1-1
fiber optic
connections, 2-2, 2-7
interface, 1-3
local loopback, 5-6
redundancy, 1-4
remote loopback, 5-8
specifications, 1-7
file system
File System menu, 4-29
viewing information, 4-29
File Utilities menu, 4-27
front panel
clearance, 2-2
connectors, 3-1
controls, 3-1
indicators, 3-1

—G—
grounding, 2-7
connection, 2-7

—H—
hardware
viewing updates, 4-27
height, 1-8
Host IP List menu, 4-17
Host IP menu, 4-17
humidity, 1-9, 2-2

—I—
indications, 1-5
normal, 3-3
indicators
specifications, 1-7
installation, 2-1, 2-3
equipment needed, 2-2
interface, 2-6
fiber optic, 1-3, 1-7, 2-2, 2-7
specifications, A-1
tributary, 1-4, 1-7, 2-1, 2-6, A-1

—J—
jumpers
internal, 2-3
main board, 2-5
setting internal, 2-3, 2-4
settings, 2-5

—L—
Local Device Loops menu, 4-25
local loopback, 5-4, 5-5
fiber optic, 5-6
setting, 4-25
setting timeout, 4-24
T1, 5-5
Local Physical Port Status menu, 4-8
Local Physical Ports Configuration screen, 4-22
Local Redundancy menu, 4-14
Local System Alarms screen, 4-11
local system status
monitoring, 4-5
values, 4-6
local system statusLocal System Status screen, 4-5, 4-27
log file, 4-10, 4-11
login screen, 4-2
loop status
displaying, 4-26
Loops Setting screen, 4-25, 4-26

—M—
Main menu, 4-2
management, 1-6
management access
setting, 4-18
Management Ethernet Status Screen, 4-8
Management Information Base, B-1
Management menu, 4-16
management port
specifications, 1-8
Management Port Configuration screen, 4-22
Manager Access menu, 4-18
manager list
Manager List screen, 4-18
setting, 4-18
menus
Baud Rate, 4-20
Change Access, 4-20
Configuration, 4-13
Control Port, 4-19
Device Info menu, 4-16
Diagnostics, 4-24
Factory Default, 4-21
File System, 4-29
File Utilities, 4-27
Host IP, 4-17
Host IP List, 4-17
Local Device Loops, 4-25
Local Physical Port Status, 4-8
Local Redundancy, 4-14
Main, 4-2
Management, 4-16
Manager Access, 4-18
map, 4-3
Monitoring, 4-4, 4-27
Physical Port Alarms, 4-12
Physical Port Monitoring, 4-4, 4-7
Physical Ports Configuration, 4-21
Redundancy, 4-14
Redundancy Mode, 4-15

Remote Device Loops, 4-25, 4-26
Remote Physical Port Status, 4-8
S/W & File Transfer, 4-27
System Configuration, 4-14
System Monitoring, 4-4, 4-27
Telnet, 4-19
Via TFTP, 4-28
monitoring, 1-6
channel port status, 4-9
Ethernet port status, 4-8
local system status, 4-5
physical port, 4-4
physical ports, 4-7
remote system status, 4-7
system, 4-4
up-link status, 4-9
Monitoring menu, 4-4, 4-27

—N—
network parameters
setting, 4-17
normal indications, 3-3

—O—
operating, 3-1
instructions, 3-1
turning off, 3-3
turning on, 3-1

—P—
package contents, 2-2
password
setting, 4-19
physical
characteristics, 1-2
specifications, 1-8
physical port
configuring, 4-21
monitoring, 4-4, 4-7
Physical Port Monitoring menu, 4-4, 4-7, 4-8
Physical Ports Configuration menu, 4-21
physical port alarms
displaying, 4-12
Physical Port Alarms menu, 4-12
port alarms, 5-3
Port Alarms screen, 4-12
power supply
AC/DC, 1-6, 1-8, 2-1, 2-8
connection, 2-7
DC, 1-6, 1-8, 2-1, 2-8
grounding, 2-7
redundant, 1-6
requirements, 1-6
specifications, 1-8
prerequisites, 2-1
product features, 1-1

—R—
rear panel, 2-6
clearance, 2-2
redundancy
configuring, 4-13
fiber optic, 1-4
power supply, 1-6
Redundancy menu, 4-14
Redundancy Mode menu, 4-15
Remote Device Loops menu, 4-25, 4-26
remote loopback, 5-4, 5-7
fiber optic, 5-8
setting, 4-26
setting timeout, 4-25
T1, 5-7
Remote Physical Port Status menu, 4-8
Remote Physical Ports Configuration screen, 4-22
Remote System Alarms screen, 4-11
remote system status
monitoring, 4-7
Remote System Status screen, 4-7
requirements, 2-1
resetting
device, 4-21
factory defaults, 4-21

—S—
S/W & File Transfer menu, 4-27
screens
Channel Port Status, 4-9
Channels Configuration, 4-23
Local Physical Ports Configuration, 4-22
Local System Alarms, 4-11
Local System Status, 4-5, 4-27
login, 4-2
Loops Settings, 4-25, 4-26
Management Ethernet Status, 4-8
Management Port Configuration, 4-22
Manager List, 4-18
Port Alarms screen, 4-12
Remote Physical Ports Configuration, 4-22
Remote System Status, 4-7
SW Files, 4-29
System Log File, 4-10
Up Link Alarms screen, 4-12
Up-Link Configuration, 4-23
Up-link Status, 4-9
setting
device information, 4-16
local loopback, 4-25
local loopback timeout, 4-24
management access, 4-18
manager list, 4-18
network parameters, 4-17
password, 4-19
remote loopback, 4-26
remote loopback timeout, 4-25
terminal communication parameters, 4-1
user name, 4-19

setup, 2-1, 2-3
site
  prerequisites, 2-1
  requirements, 2-1
software
  boot partition, 4-30
  downloading, 4-27
  downloading using X-Modem protocol, 4-29
  downloading via TFTP protocol, 4-27
  viewing updates, 4-27
specifications, 1-7
  alarm connector, 1-8
  control DTE supervisory port, 1-8
  environment, 1-9
  fiber optic, 1-7
  indicators, 1-7
  interface, A-1
  management port, 1-8
  physical characteristics, 1-8
  power supply, 1-8
  T1 tributary interface, 1-7
status
  channel port, 4-9
  Ethernet port, 4-8
  local physical ports, 4-8
  local system, 4-5
  loops, 4-26
  remote physical ports, 4-8
  remote system, 4-7
  up-link, 4-9
SW Files screen, 4-29
switches
  internal, 2-3
  main board, 2-5
  setting internal, 2-3, 2-4
  settings, 2-5
switching
  automatic, 1-4
system
  alarms, 4-11, 5-3
  log file, 4-10, 4-11
  monitoring, 4-4
System Configuration menu, 4-14
system log file
  clearing, 4-11
  displaying, 4-10
  System Log File screen, 4-10
System Monitoring menu, 4-4, 4-27

—T—
T1
  local loopback, 5-5
  remote loopback, 5-7
technical information, 1-7
Telnet menu, 4-19
temperature, 1-9, 2-2
terminal
  entering the session, 4-2
  management modes, 4-1
  setting communication parameters, 4-1
testing, 1-5, 5-1
TFTP protocol, 4-27
tributary interface, 1-4, A-1
  connecting channels, 2-6
  connections, 2-1
troubleshooting, 5-1
turning the unit
  off, 3-3
  on, 3-1

—U—
updates
  hardware, 4-27
  software, 4-27
Up-link
  alarms, 5-3
  monitoring the status, 4-9
  Up Link Alarms screen, 4-12
  Up-Link Configuration screen, 4-23
  Up-link Status screen, 4-9
user name
  setting, 4-19

—V—
Via TFTP menu, 4-28
viewing
  file system information, 4-29
  hardware updates, 4-27
  software updates, 4-27

—W—
weight, 1-8
width, 1-8

—X—
X-Modem protocol, 4-29

SUPPLEMENT

DC Power Supply Connection – Terminal Block Connector

Note: Ignore this supplement if the unit is AC-powered.

Certain DC-powered units are equipped with a plastic 3-pin *VDC-IN* power input connector, located on the unit rear panel. Different variations of the connector are shown in *Figure* 1. All are functionally identical.

Supplied with such units is a kit including a mating Terminal Block (TB) type connector plug for attaching to your power supply cable.

Connect the wires of your power supply cable to the TB plug, according to the voltage polarity and assembly instructions provided below.

Caution: *Prepare all connections to the TB plug* ***before*** *inserting it into the unit's VDC-IN connector.*

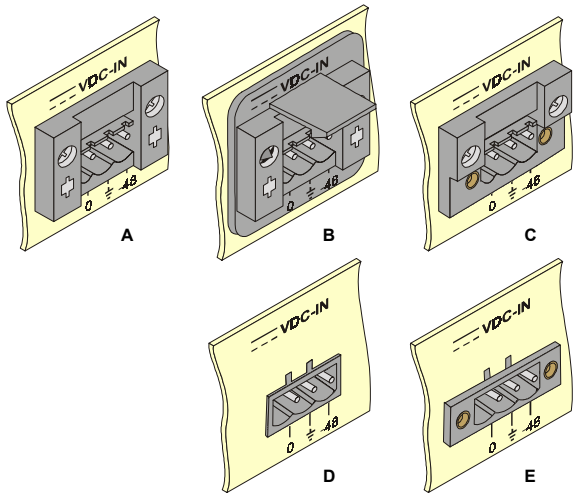


Figure 1. TB DC Input Connectors Types Appearing on Unit Panels

Preparing and Connecting the Power Supply Cable with the TB Plug

Refer to *Figure 2* for assistance.

1. Strip the insulation of your power supply wires according to the dimensions shown.
2. Place each wire lead into the appropriate TB plug terminal according to the voltage polarity mapping shown in *Figure 4.* (If a terminal is not already open, loosen its screw). Afterwards, tighten close the three terminal screws.
3. Pull a nylon cable tie (supplied) around the power supply cable to secure it firmly to the TB plug grip, passing the tie through the holes on the grip.
4. Isolate the exposed terminal screws/wire leads using a plastic sleeve or insulating tape, to prevent the possibility of short-circuit.
5. Connect the assembled power supply cable to the unit by inserting the TB plug into the unit's *VDC-IN* connector until it snaps into place.

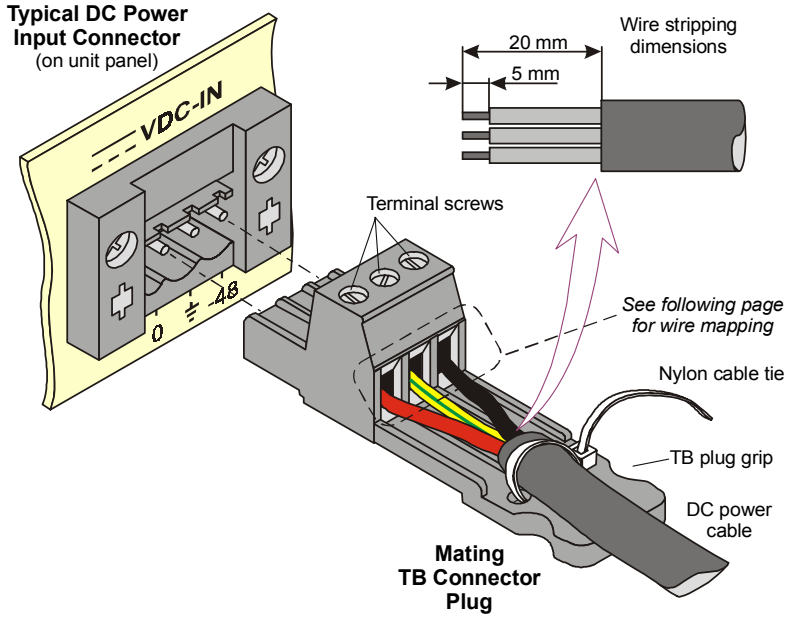


Figure 2. TB Plug Assembly

Note: Certain TB plugs are equipped with captive screws for securing the assembled cable's TB plug to the unit's *VDC-IN* connector (C and E types only). To secure the plug, tighten the two screws on the plug into the corresponding holes on the sides of the input connector as shown in *Figure 3*.

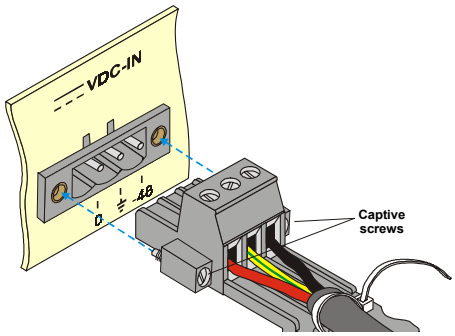


Figure 3. TB Plug with Captive Screws (optional)

DC Power Supply Wire Voltage Polarity

Refer to *Figure 4* for proper mapping of the power supply wire leads to the TB plug's three terminals.

> ***Warning:***
> - *Reversing the wire voltage polarity can cause damage to the unit!*
> - *Always connect a ground (earth) wire to the TB plug's Chassis (frame) Ground terminal. Connecting the unit without a protective ground, or interruption of the grounding (for example, by using an extension power cord without a grounding conductor) can cause harm to the unit or to the equipment connected to it!*

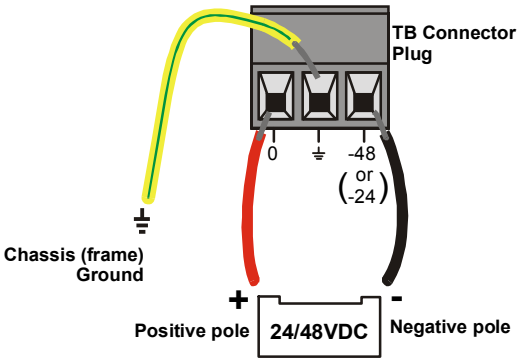


Figure 4. Power Supply Wire Mapping to TB Plug